RG-NPE

RGOS 10.3(4T76)

ɔ

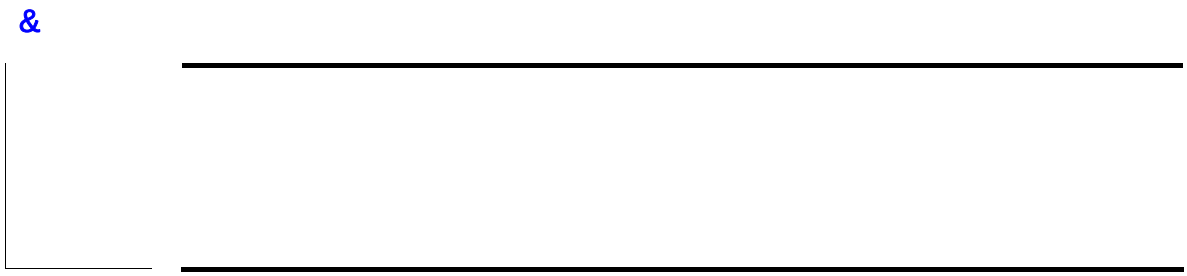
ɔ

ɔ

1.

ɐ

3.



1

-
-
-
- **no default**
-
-
-
-
-

1.1

			exit enable	
	enable		disable configure	
	configure		exit end interface interface vlan	
	interface		end exit interface	
	vlan *vlan_id*		end exit	

1.2

?

Help	
abbreviated-command-entry?	di
abbreviated-command-entry<Tab>	show conf<Tab> show configuration
?	show ?
command keyword ?	snmp-server community ?

1.3

show configuration

Ruijie# show conf

1.4 no default

no no

no shutdown shutdown

no

default **default**

default **no**

default **no**

default

1.5 CLI

1.6

1.7

›

›

1.7.1

1.7.2

Show

show

show *any-command* **exclude** *regular-expression*	
show *any-command* **include** *regular-expression*	

show

1.9

```
.....
```

command-alias=original-command

```
Ruijie#s?
*s=show  show  start-chat  start-terminal-service
```

```
Ruijie#s?
*s=show  *sv=”show version” show  start-chat
start-terminal-service
```

```
Ruijie# s?
show  start-chat  start-terminal-service
```

```
Ruijie(config-if)#ia ?
  A.B.C.D  IP address
  dhcp     IP Address via DHCP

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

ip address

show aliases

1.9.1 CLI

2

2.1

&

2.1.1

enable secret

ʒ

í

Step 2	**enable secret level** *level* *encryption-type encrypted-password*	
Step 3	**service password-encryption**	
Step 4	**enable** *level*	

2.1.1.4.2

reload

test

```
Ruijie# configure terminal
Ruijie(config)# privilege exec all level 1 reload
Ruijie(config)# enable secret level 1 0 test
Ruijie(config)# end
```

```
Ruijie# disable 1
Ruijie> reload ?
at                  reload at a specific time/date
cancel               cancel pending reload scheme
in                  reload after a time interval
<cr>
```

```
Ruijie# configure terminal
Ruijie(config)# privilege exec all reset reload
Ruijie(config)# end
```

```
Ruijie# disable 1
Ruijie> reload ?
% Unrecognized command.
```

^ ~ ?

line **line**

Step 1	**password 0 7** *line*	**line**
Step 2	**login**	**line**

&	line

lock

line

lock

Step 1	lockable	line
Step 2	lock	line

2.1.2

Step 1	**username** *name* **password** *password* **password** *encryption-type encrypted password*	

Step 2	**login** **authentication default** *list-name*	

&	

2.1.3

Step 1	**clock set**	

```
Ruijie# clock set 10:10:12 6 20 2003      //
Ruijie# show clock                       //
clock: 2003-6-20 10:10:54
```

show clock

```
Ruijie# show clock                              //
```

```
clock: 2003-5-20 11:11:34
```

clock update-calendar

Step 1	**clock update-calendar**	

```
Ruijie# clock update-calendar
```

2.1.4

reload

reload
in at cancel

Â **reload in** *mmm hhh:mm string*

mmm hhh:mm
string

reload in *10 test*

Â **reload at**

reload at *08:30 11 1 newday*

reload at *12:00 1 1 2006 newyear*

Â

reload cancel

	at
&	

Step 1	**reload at** *hh:mm month day yea reload-reason*

```
Ruijie# reload at 12:00 1 11 2005 midday//
Ruijie# show reload                      //
Reload scheduled in 16581 seconds.
At 2005-01-11 12:00
Reload reason: midday
```

/

Step 1	**reload in** *mmm reload-reason*

Step 2

reload in *hhh:mm reload-reason*

no hostname

```
Ruijie# configure terminal                    //
Ruijie(config)# hostname RGOS      //
RGOS(config)#                                   //
```

}

prompt

Step 1 **prompt** *string*	

no prompt

2.1.6

Step 1

banner motd *c message c*	

no banner motd

```
Ruijie(config)# banner motd #                    //
Enter TEXT message.  End with the character '#'.
Notice: system will shutdown on July 6th.#       //
Ruijie(config)#
```

Step 1

	c
banner login *c message c*	

no banner login

```
Ruijie(config)# banner login #                   //
Enter TEXT message.  End with the character '#'.
Access for authorized users only. Please enter your password.
#                                                //
```

```
Ruijie(config)#
```

```
C:\>telnet 192.168.65.236
 Notice:  system will shutdown on July 6th.
 Access for authorized users only. Please enter your password.
 User Access Verification
 Password:
```

2.1.7

Step 1	**show version**	

Step 1	**show version devices**	
Step 2	**show version slots**	

2.1.8

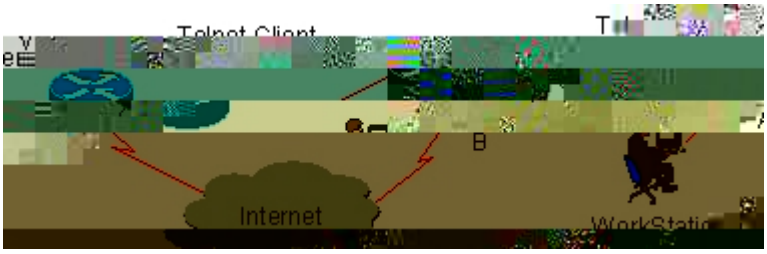
ﾉ

Step 1	**speed** *speed*	

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

```
Length: 25 lines, Width: 80 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: 22 bytes
Total output:  115 bytes
Data overflow:  0 bytes
stop rx interrupt:  0 times
Modem: READY
```

2.1.9 telnet



1.

Step 1

telnet *host port* **/source ip**

Step 1	**exec-timeout** *minutes* *seconds*	*minutes* *seconds*

no exec-timeout

```
Ruijie# configure terminal                    //
Ruijie# line vty 0                           //
Ruijie(config-line)# exec-timeout 20        //
```

Step 1	**session-timeout** *minutes* **output**	*minutes* **output**

no exec-timeout

```
Ruijie# configure terminal                    //
Ruijie(config)# line vty 0                   //
```

Step 1	**execute flash:** *filename*	

Telnet

```
configure terminal
line tty 1 16
transport input all
no exec
end
```

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

&	

2.1.12

Step 1	**enable service snmp-agent**	
Step 2	**enable service ssh-sesrver**	
Step 3	**enable service telnet-server**	
Step 4	**enable service web-server**	

no enable service

```
Ruijie# configure terminal                  //
Ruijie(config)# enable service ssh-server   //    SSH Server
```

2.1.13 HTTP

Step 1	**ip http port** *number*	
Step 2	**ip http authentication** **enable local**	**enable** **local**

no

```
Ruijie# configure terminal                    //
Ruijie(config)# enable service web-server     //    Web Server
Ruijie(config)# username name password pass   //
Ruijie(config)# username name privilege 15    //
Ruijie(config)# ip http port 8080             //
Ruijie(config)# ip http authentication local //
```

2.1.14

╕ ў

Step 1 **boot system** *priority filename*	

boot system

“ ”

```
Ruijie(config)# boot system 5 flash:/rgos.bin
Ruijie(config)# boot system 5 flash:/rgos_bak.bin
Set boot system file error: priority 5 was assigned to file
[flash:/rgos.bin] already.
Boot system config:
=====================================================
Prio     Size             Modified  Name
---- --------- ------------------- -----------------
  1
  2
  3
  4
  5    3205120 2008-08-26 05:22:46 flash:/rgos.bin
  6
  7
  8
  9
 10
=====================================================
Ruijie(config)# boot system 6 flash:/rgos_bak.bin
```

ў

boot system

```
Ruijie# show boot system
Boot system config:
=====================================================
Prio     Size             Modified  Name
---- --------- ------------------- -----------------
  1
  2
  3
  4
  5    3205120 2008-08-26 05:22:46 flash:/rgos.bin
  6
  7
  8    3205120 2008-08-26 05:25:09 flash:/rgos_bak.bin
```

```
 9
10
=====================================================
```

“ ”

```
Ruijie(config)# boot system 1 flash:/rgos_bak.bin
File [flash:/rgos_bak.bin] has been configured with priority 8,
Change the priority to [1]? [yes] yes


Ruijie# show boot system
Boot system config:
=====================================================
Prio     Size             Modified  Name
---- --------- ------------------- ------------------
 1    3205120 2008-08-26 05:25:09 flash:/rgos_bak.bin
 2
 3
 4
 5    3205120 2008-08-26 05:22:46 flash:/rgos.bin
 6
 7
 8
 9
10
=====================================================
```

ў

Step 1

no boot system *priority*

```
Ruijie(config)# no boot system
Clear ALL boot system config? [no] yes
```

	no boot system “ ”

Step 1	**show boot system**	

```
Ruijie# show boot system
Boot system config:
=====================================================
```

1

```
Ruijie(config)# boot system 5 flash:/rgos.bin
```

boot system 1 ÖG!5BAęÉAÛ'ë¸_ c á

Step 1	**boot config** *prefix:/[directory/]filename*	
Step 2	**no boot config**	

&	

ﺍ ﺓﻟ Ò 2 ﺩ

“ ”

Â **service config** **boot network**
boot config

Â

```
Ruijie(config)# service config
Ruijie(config)# boot network tftp://192.168.7.24/config.text
```

Step 1	**show boot config**	
Step 2	**show boot network**	

```
Ruijie# show boot config
Boot config file: [flash:/config_main.text]
Service config: [Disabled]
```

```
Ruijie# show boot network
Network config file: [tftp://192.168.7.24/config.text]
Service config: [Enabled]
```

Â

```
Service config: [Enabled]
Ruijie# show boot config
Boot config file: [flash:/router_1.text]
Service config: [Enabled]
```

3

3.1

12K

copy flash: *filename* **sour** *directoryname*	

```
Ruijie# copy flash:config.tex flash:tmp/
Ruijie# copy flash:con_bak.txt flash:config.text
```

3.2.4

mkdir *directoryname*	

```
Ruijie# mkdir bak
```

3.2.7

rename flash: *old_filename* **flash:** *new_filename*	*old_filename* *new_filename*

3.2.8

pwd	

3.2.9

del *filename*	

```
Ruijie# del mnt/large.c
```

3.2.10

rmdir *directoryname*	

```
Ruijie# rmdir mnt
```

4

4.1

4.2

ˌ

ˌ

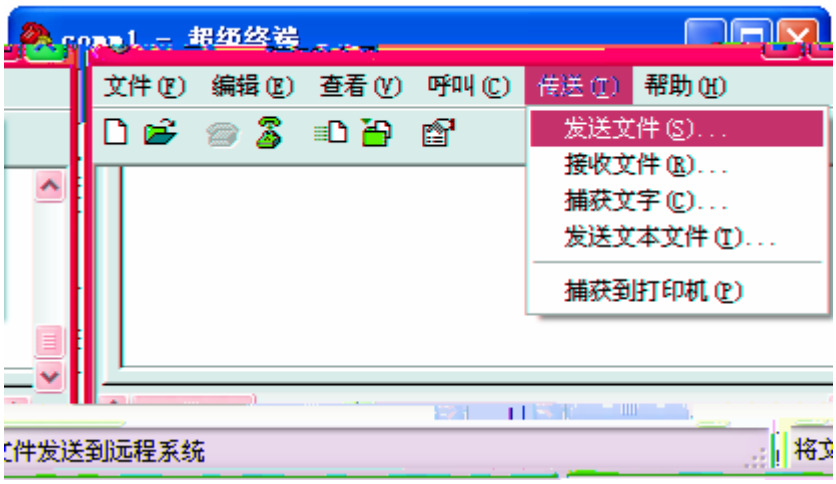
4.2.1 TFTP

- è ǐ

copy tftp: **flash:** **vrf**

copy tftp: **flash:** **vrf**

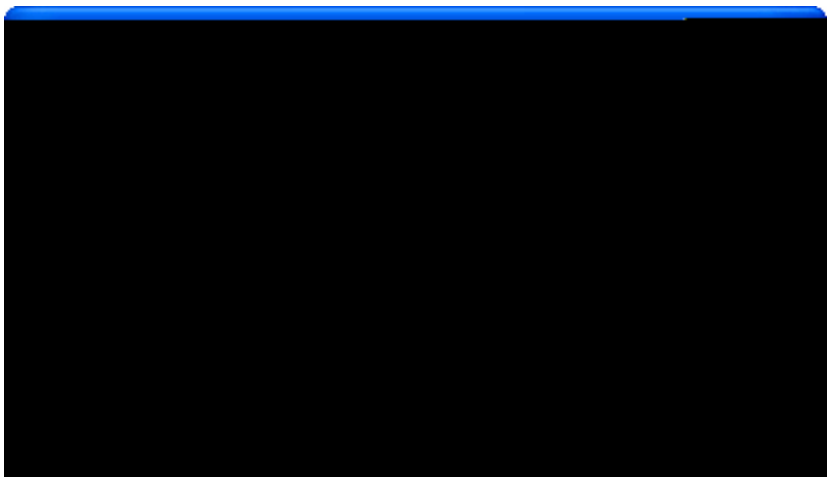
4.2.2 XMODEM



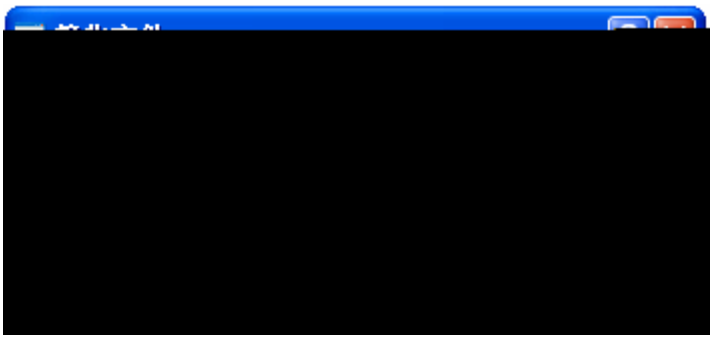
1

2

copy xmodem flash *filename*	*filename*



3



4

filename

copy flash *filename* **xmodem**

show version

redundancy

force-switchover

，

rgos.bin

copy

```
Upgrade Slave CM MAIN successful!!
Upgrade CM MAIN successful!!



Installing is in process ......
Do not restart your machine before finish !!!!!!
......


Installing process finished ......
Restart machine operation is permited now !!!!!!


System restarting, for reason 'Upgrade product !'.



System load main program from install package ......




A new card is found in slot [1].
System is doing version synchronization checking ......
Current software version in slot [1] is synchronous.
System needn't to do version synchronization for this card ......
```

```
System is doing version synchronization checking ......
Card in slot [3] need to do version synchronization ......


Version synchronization begain ......
Keep power on, don't draw out the card and don't restart your machine
before finished !!!!!!


Transmission is OK, now, card in slot [3] need restart ...
Software installation of card in slot [3] is in process ......
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!
Software installation of card in slot [3] has finished
successfully ......
The version synchronization of card in slot [3] get finished
successfully.
```

&

¸

5 HTTP

5.1 HTTP

5.1.1 HTTP

5.2


```
Ruijie# http update web character-db //    WEB
updating files, please wait...
update success!
```

5.3.2

Step 2	**http update set oob**	
Step 3	**show running**	

no http update set oob

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# http update set oob
Ruijie(config)# exit
```

6

6.1

6.2

6.2.1

interface *interface-type interface-number*	
no interface *interface-type interface-number*	

```
Ruijie# config terminal
Ruijie(config)# interface GigabitEthernet 0/0
```

6.2.2 IP

ip address *ip-address ip-mask*	
no ip address	

6.2.3

description *interface-description*	
no description	

6.2.4 MTU

mtu *bytes*	
no mtu	

6.2.5 Bandwidth

bandwidth *kilobits*	
no bandwidth	

6.2.6

Hold-Queue *Length* **in out**	
no Hold-Queue	

6.3

›

›

›

6.3.1

Show interface GigabitEthernet	

Clear counters GigabitEthernet	**show interface**
Clear interface GigabitEthernet	

clear counter **show interface gigabitEthernet***1/0*

```
Ruijie# show interface gigabitEthernet 1/0
gigabitEthernet 1/0 is DOWN  , line protocol is DOWN
Interface address is: 192.168.10.10/24
MTU 1500 bytes, BW 2000 Kbit
Keepalive interval is 10 sec , set
Carrier delay is 2 sec
RXload is 1 ,Txload is 1
Queueing strategy: WFQ
```

6.4.2

```
Ruijie(config)# Interface gigabitEthernet 0/0
Ruijie(config-if)# shutdown
```

7 LAN

7.1

7.1.1

ɔ

ɔ

ɔ

Ո

Interface **GigabitEthernet** *interface-number*	
Interface **GIgabitethernet** *interface-number*	

ip address *ip-address ip-mask* **secondary**	
no ip address *ip-address ip-mask* **secondary**	

```
Encapsulation protocol is Ethernet-II, loopback not set
Keepalive interval is 10 sec  set
Carrier delay is 2 sec
RXload is 1 ,Txload is 1
Queueing strategy: FIFO
Output queue 0/40, 0 drops;
Input queue 0/75, 0 drops
5 minutes input rate 281 bits/sec, 0 packets/sec
5 minutes output rate 0 bits/sec, 0 packets/sec
82 packets input, 7947 bytes, 0 no buffer
Received 76 broadcasts, 0 runts, 0 giants
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 abort
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 3 interface resets
Link Mode: 1000M/Full-Duplex, media-type is twisted-pair.
Output flowcontrol is off;Input flowcontrol is off.
```

Л

clear counters

7.2.2 VLAN

،

،

،

interface GigabitEthernet *Sub_interface_number*	

encapsulation dot1Q

VlanID

،	،
ip address *ip-address mask*	

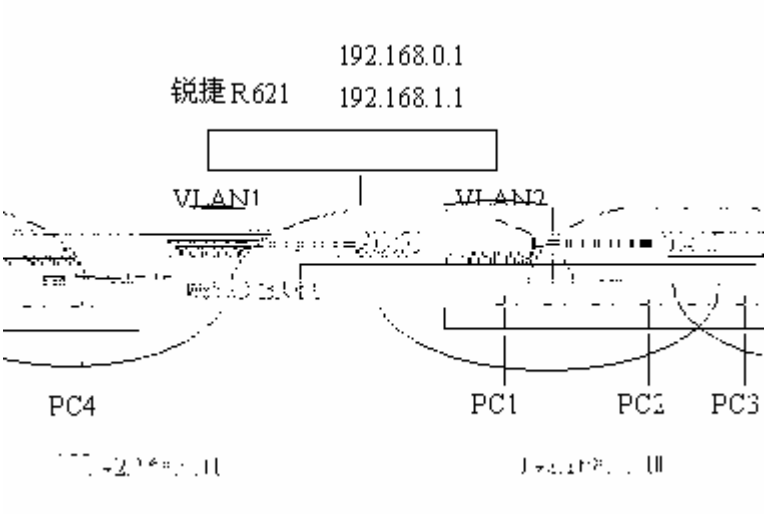
7.2.3 VLAN

debug show

debug vlan	
no debug vlan	
show vlans *VlanID*	
clear vlan *VlanID*	

7.2.4 VLAN

،



3

，

```
hostname "Ruijie"
!
interface gigabitEthernet 0/0
no ip address
!
interface gigabitEthernet
```

8

8.1 Loopback

interface loopback *loopback-interface-number*	
no interface loopback *loopback-interface-number*	

interface loopback *loopback-interface-number*

no

interface loopback *loopback-interface-number*

show interfaces loopback *loopback-interface-number*

show interfaces loopback *loopback-interface-number*	

show interfaces loopback

```
Ruijie# show interfaces loopback 0
Loopback 0 is UP  , line protocol is UP
Hardware is  Loopback
```

```
Interface address is: no ip address
MTU 1500 bytes, BW 8000000 Kbit
Encapsulation protocol is LOOPBACK, loopback not set
Keepalive interval is 0 sec , no set
Carrier delay is 2 sec
RXload is 1 ,Txload is 1
Queueing strategy: FIFO
Output queue 0/40, 0 drops;
Input queue 0/75, 0 drops
5 minutes input rate 0 bits/sec, 0 packets/sec
5 minutes output rate 0 bits/sec, 0 packets/sec
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 abort
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
```

8.2 NULL

help **exit**

Ruijie(config)#**ip route** *127.0.0.0 255.0.0.0* **null** *0*

interface null *0*	

no interface null

8.3 Dialer

8.3.1 Dialer

8.3.2 Dialer

interface dialer

no interface dialer

```
5 minutes input rate 0 bits/sec, 0 packets/sec
5 minutes output rate 0 bits/sec, 0 packets/sec
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 abort
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
```

8.4

8.4.1

8.4.2

interface gigabitEthernet

no interface gigabitEthernet

interface gigabitEthernet *slot-number/interface-number.subinterface-number*	
no interface gigabitEthernet *slot-number* */interface-number.subinterface-number*	

8.4.3

show interfaces

debug

9

9.1

9.1.1

interface *ID*	

```
Ruijie(config)# interface gigabitethernet 0/1
Ruijie(config-if)#
```

9.1.2 interface range

interface range

interface range

interface range *port-range* **macro** *macro_name*	**interface range**

interface range

vlan *vlan-ID - vlan-ID*

GigabitEthernet *slot/ port - port*

Gigabitethernet *slot/ port - port*

TenGigabitethernet *slot port port*

interface range

```
Ruijie# configure terminal
Ruijie(config)# interface range GigabitEthernet 1/1 - 10
Ruijie(config-if-range)# no shutdown
Ruijie(config-if-range)#
```

```
Ruijie# configure terminal
Ruijie(config)# interface range GigabitEthernet 1/1-5, 1/7-8
Ruijie(config-if-range)# no shutdown
Ruijie(config-if-range)#
```

interface range

macro **define interface-range**

ine TT13 Te012 9 0 0 9 -(c-1.5499.28 interface-range name TT13 Te0191.1 -7.846c-1

```
Ruijie# configure terminal
Ruijie(config)# no define interface-range ports1to2N5to7
Ruijie# end
```

9.1.3

medium-type fiber copper	

```
Ruijie# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Ruijie(config)# interface gigabitethernet 0/1
Ruijie(config-if)# medium-type fiber
Ruijie(config-if)# end
```

9.1.4

“ ”

description *string*	

```
Ruijie# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Ruijie(config)# interface gigabitethernet 0/1
Ruijie(config-if)# description PortForUser A
```

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

```
Ruijie(config-if)# speed 1000
Ruijie(config-if)# duplex full
Ruijie(config-if)# flowcontrol off
Ruijie(config-if)# end
```

9.1.6 MTU

Mtu *num*	

```
Ruijie# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Ruijie(config)# interface gigabitethernet 0/1
Ruijie(config-if)# mtu 64
Ruijie(config-if)# end
```

9.2

show

show interfaces *interface-id*	
show interfaces *interface-id* **status**	
show interfaces *interface-id* **description**	
rfaces **nters**	

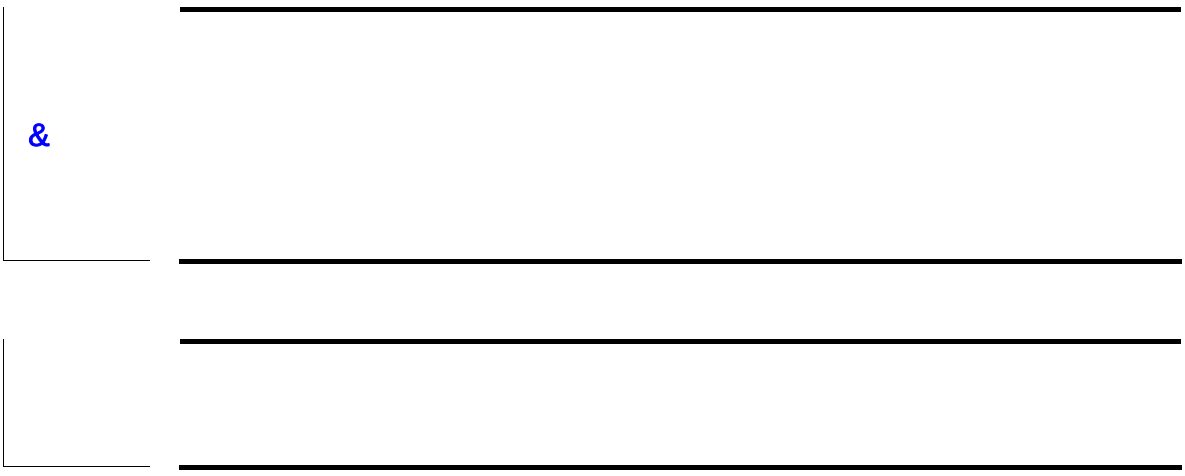
9.3 LinkTrap0.M(0.J []0 d Tf0.0132 Tc 03.0073 503 -20

10

10.1

10.1.1

10.1.2



Step 4	**link-mode** *interface-name1 interface-name2* *forward* | *sniffer* | *bypass*	*interface-name1* *interface-name2* *Forward* *Sniffer* *Bypass*
Step 5	**native-vlan** *vlan-id num*	
Step 6	**end**	
Step 7	**show running**	

no link-mode

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# bridge-map 0
Ruijie(config-bridge-map)# link-mode GigabitEthernet 0/0
GigabitEthernet 0/1 sniffer
Ruijie(config-bridge-map)# native-vlan 100
Ruijie(config-bridge-map))# end
```

10.3.3

Step 1	**configure terminal**	

Step 2	**specify interface** *interface-name* *lan* | *wan*	*interface-name* *lan* *wan:*
Step 4	**end**	
Step 5	**show running**	

&	

```
Ruijie(config)#specify interface GigabitEthernet 0/0 lan

Ruijie(config)#specify interface GigabitEthernet 0/0 wan

Ruijie(config)#no specify interface GigabitEthernet 0/0
```

10.3.4

Step 1	**configure terminal**	
Step 2	**xaui-mode slot** *slot-num*	**slot** *slot-num*
Step 4	**end**	
Step 5	**show running**	

&

```
Ruijie(config)#xaui-mode slot 0
Please save the config, and reload NPE60 to take effect!

Ruijie(config)#no xaui-mode slot 0
Please save the config, and reload NPE60 to take effect!
```

K

10.3.5 bypass

Step 1	**configure terminal**	
Step 2	**bypass couple** *couple-num*	*couple-num*
Step 4	**end**	
Step 5	**show running**	

```
Ruijie(config)#bypass couple 0
Couple 0 bypass started.
```

```
Ruijie(config)#no bypass couple 0
Couple 0 bypass stoped.
```

Step 1	**configure terminal**	
Step 2	**bypass copper couple** *couple-num*	*couple-num*
Step 4	**end**	
Step 5	**show running**	

Step 1	**configure terminal**	
Step 2	**bypass fiber couple** *couple-num*	*couple-num*
Step 4	**end**	
Step 5	**show running**	

```
Ruijie(config)#bypass copper couple 0
Copper Couple 0 bypass started.

Ruijie(config)#no bypass copper couple 0
Copper Couple 0 bypass stoped.

Ruijie(config)#bypass fiber couple 0
Fiber Couple 0 bypass started.
```

```
Ruijie(config)#no bypass fiber couple 0
Fiber Couple 0 bypass stoped.
```

&

K

10.4

show bridge-map *bridge-num*	
show sys-mode	
show environment	

show bridge-map 0

```
Ruijie#show sys-mode
System is gateway mode.
LAN: GigabitEthernet 0/0 GigabitEthernet 0/3 GigabitEthernet 0/5
WAN: GigabitEthernet 0/1 GigabitEthernet 0/2 GigabitEthernet 0/4
```

NPE60:

```
Ruijie#sh environment
---environment information---
CPU Temperature is 34
fan works in high speed mode.

FAN 1 is OK!
FAN 2 is OK!
FAN 3 is OK!
FAN 4 is OK!

P0WERTc 0sTw  0 0 10.02 100.5253 T435090 T[(NP)0.022-153.64 -2.2 3.5TjET550 -2.
```

11

11.1

11.1.1

“ ”

11.1.2

11.2

11.3 MGMT

Â
Â
Â
Â

11.3.1 MGMT IP

Step 1	**configure terminal**	
Step 2	**interface mgmt 0**	
Step 3	**ip address** *ip-address subnet-mask*	

&	

```
Ruijie#
```

K

11.3.2 MGMT

Step 1	**configure terminal**	
Step 2	**interface mgmt 0**	
Step 3	**gateway** *A.B.C.D*	
Step 4	**mtu** *mtu-value*	
Step 5	**speed 10 100 1000 auto**	
Step 6	**duplex full**	

K

11.3.3

- ping oob
- traceroute oob
- telnet oob
- sntp enable oob

- **ping oob**

ping oob *host*	

```
Ruijie# ping oob 192.168.1.2
```

copy *url* **tftp**

oob_tftp

copy *source-url destination-url*	*source-url* *destination-rul*

```
Ruijie#copy oob_tftp://192.168.1.2/ngsa-compress.bin flash:file.bin
Accessing tftp://192.168.1.2/ngsa-compress.bin...
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!
Success : Transmission success,file length 1183856
```

K

12 LINE

12.1

12.2 LINE

12.2.1 LINE

configure terminal	
Line vty *line number*	
transport input all ssh telnet none	
no transport input	
default transport input	

12.2.4 Line

configure terminal	
Line vty *line number*	
access-class *access-list-number* **in | out**	
no access-class *access-list-number* **in |out**	

13

13.1

13.2

13.2.1

-
-
-

›

13.2.2

dldp ip [nexthopip]	

&

13.2.3 interval

dldp ip interval val	

13.3 retry

dldp ip retry val	

13.4 /

dldp passive	

14

14.1 PPPOE

14.1.1 PPPOE

14.1.2 PPPOE

ъ

ъ

ъ

Л∪

ъ

ъ

no shutdown

pppoe enable	

pppoe-client **dial-pool-number** *pool-number* **dial-on-demand**	

pppoe-client **dial-pool-number pool-number no-ddr**	

interface dialer *dialer-number*	
ip address negotiate	
dialer pool *pool-number*	
dialer idle-timeout *seconds*	
encapsulation ppp	
mtu *1488*	
dialer-group *dialer-group-number*	

ppp pap sent-username *username* **password** *password*	

&

clear pppoe tunnel

،

،

14.1.3 PPPOE

show pppoe tunnel session	
show interfaces dialer *dialer-number*	
debug pppoe datas errors events packets	

14.1.4 PPPOE

，

```
interface GigabitEthernet0/1
ip address 192.168.0.1 255.255.255.0
ip nat inside
ip mtu 1488
duplex auto
speed auto


interface Dialer1
ip address negotiate
mtu 1488
encapsulation ppp
ip nat outside
dialer pool 10
dialer-group 1
dialer idle-timeout 300
ppp pap sent-username pppoe password 0 pppoe
!
ip nat inside source list 1 interface Dialer1
4CT*m5alet(1 )6plertarn
ip(ro)6(nte)6 100.0(0.)6( Dd)6(ia)6(le(1 1096( )]TJ0.017 Tc 0 -1.543 TD(! )T



!
```

15 IP

15.1 IP

15.1.1 IP

&

“ ”

15.1.2 IP

- د
- د
- د د

15.1.2.1.1 IP

&

ip address *ip-address* *mask* **secondary**	

^ ~

0 0 1 -6 1 1 2 CE3C2D14>-6<01C4>]TJ Td (48)Tj /C2_0 1 Tf 0.0

15.1.2.2.2 ARP

15.1.2.2.3 ARP

arp timeout *seconds*	
no arp timeout	

no ip routing	
ip routing	

“ ”

›

›

15.1.2.4.1

“ ”

ip directed-broadcast *access-list-number*	
no ip directed-broadcast	

15.1.2.4.2 IP

“ ”

ip broadcast-address *ip-address*	
no ip broadcast-address	

15.1.3 IP

،

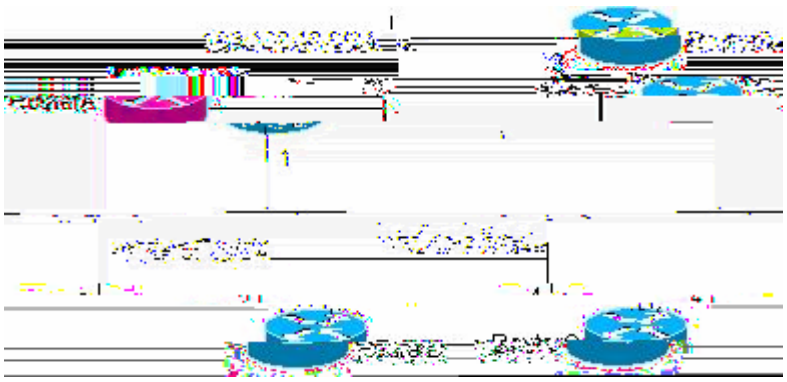
،

clear arp-cache	
clear ip route *network mask*	

show arp	
show ip arp	

show ip interface *interface-type interface-number*	
show ip route *network mask*	
show ip route	
ping *ip-address* **length** *bytes* **ntimes** *times* **timeout** *seconds*	

15.1.4 IP



1 IP

```
interface GigabitEthernet 0/0
ip address 172.16.3.1 255.255.255.0 secondary
ip address 192.168.12.1 255.255.255.0
!
interface GigabitEthernet 0/1
ip address 172.16.1.1 255.255.255.0
!
router rip
network 172.16.0.0
network 192.168.12.0
```

```
interface GigabitEthernet 0/0
ip address 172.16.3.2 255.255.255.0 secondary
ip address 192.168.12.2 255.255.255.0
!
interface GigabitEthernet 0/1
ip address 172.16.2.1 255.255.255.0
!
router rip
network 172.16.0.0
network 192.168.12.0
```

15.2 IP

15.2.1 IP

，

15.2.2 IP

ډ

ډ

ډ

ډ

ډ

a ۷

ip mask-reply	
no ip mask-reply	

ip mtu *bytes*	
no ip mtu	

ip source-route	
no ip source-route	

16 IPv4

16.1 IPv4

16.1.1 IPv4

Â

show ip ref packet-statistic clear	

16.4.2

show ip ref adjacency glean local *ip* **interface** *interface_type interface_number* **statistic**	

16.4.3

show ip ref exact-route vrf	

16.4.4

show ip ref route vrf *vrf_name* **default** *ip mask* **statistic]**	

17

17.1

17.1.1

17.1.2

show ip fpm flows

show ip fpm flows filter *ip_protocol_number urce_ip source_ip_mask_len dest_ip dest_ip_mask_len*	

17.2

show ip fpm counters

show ip fpm counters	

17.3

show ip fpm statistic

show ip fpm statistics	

17.4

show ip fpm user

show ip fpm users	

17.5

ip session timeout icmp-closed | icmp-connected | icmp-started | rawip-closed | rawip-connected | rawip-established | rawip-started | tcp-close-wait | tcp-closed | tcp-established | tcp-fin-wait | tcp-last-ack | tcp-syn-receive | tcp-syn-sent | tcp-time-wait | udp-closed | udp-connected | udp-established | udp-started *num*	

17.6

icmp-connected	
icmp-started	
rawip-closed	
rawip-connected	
rawip-established	
rawip-started	

tcp-close-wait

tcp-last-ack	
tcp-syn-receive	
tcp-syn-sent	
tcp-time-wait	
udp-closed	
udp-connected	
udp-established	
udp-started	

Â

Â

Â

17.6.1

17.6.2

17.6.3

18 NAT

Step 1	**ip nat inside source static** **UDP** **TCP** *local-address port* *global-address* *port* **permit inside** **vrf** *name*

Step 1	**ip nat outside source static** *global-address local-address* *name*	
Step 2	**interface** *interface-type interface-number*	
Step 3	**ip nat inside**	
Step 4	**interface** *interface-type interface-number*	
Step 5	**ip nat outside**	

K

18.1.4 TCP

ip nat pool *address-pool start-address end-address* **netmask** *mask* **prefix-length** *prefix-length*	
access-list *access-list-number permit ip-address* **wildcard**	

ip nat inside destination list *access-list-number* **pool** *address-pool* **vrf** *name* **interface** *interface-type interface-number*	

```
!
interface GigabitEthernet 0/0
ip address 192.168.12.1 255.255.255.0
ip nat inside
!
interface GigabitEthernet 1/0
ip address 200.168.12.1 255.255.255.0
ip nat outside
!
ip nat pool net200 200.168.12.2 200.168.12.100 netmask 255.255.255.0
ip nat inside source list 1 pool net200
!
access-list 1 permit 192.168.12.0 0.0.0.255
```

```
!
interface GigabitEthernet 0/0
ip address 192.168.12.1 255.255.255.0
ip nat inside
!
interface GigabitEthernet 1/0
ip address 200.168.12.200 255.255.255.0
ip nat outside
!
ip nat pool net200 200.168.12.200 200.168.12.200 netmask 255.255.255.0
ip nat inside source list 1 pool net200
access-list 1 permit 192.168.12.0 0.0.0.255
```

```
Ruijie# show ip nat translations
```

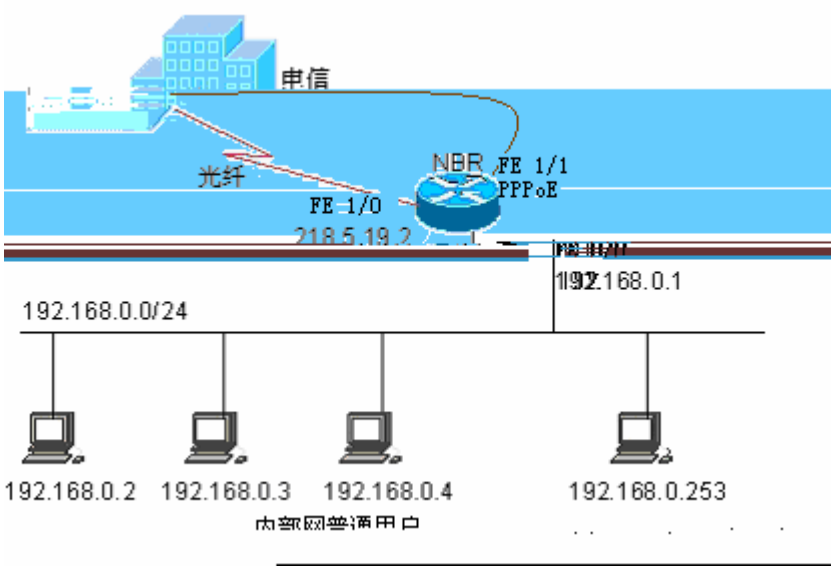
```
Pro Inside global     Inside local      Outside local     Outside
global
tcp 200.168.12.200:2063 192.168.12.65:2063 168.168.12.1:23
168.168.12.1:23
```

```
!
interface GigabitEthernet 0/0
ip address 192.168.12.1 255.255.255.0
ip nat inside
!
interface GigabitEthernet 1/0
ip address 200.198.12.1 255.255.255.0
ip nat outside
!
ip nat inside source static tcp 192.168.12.3 80 200.198.12.1 80
```

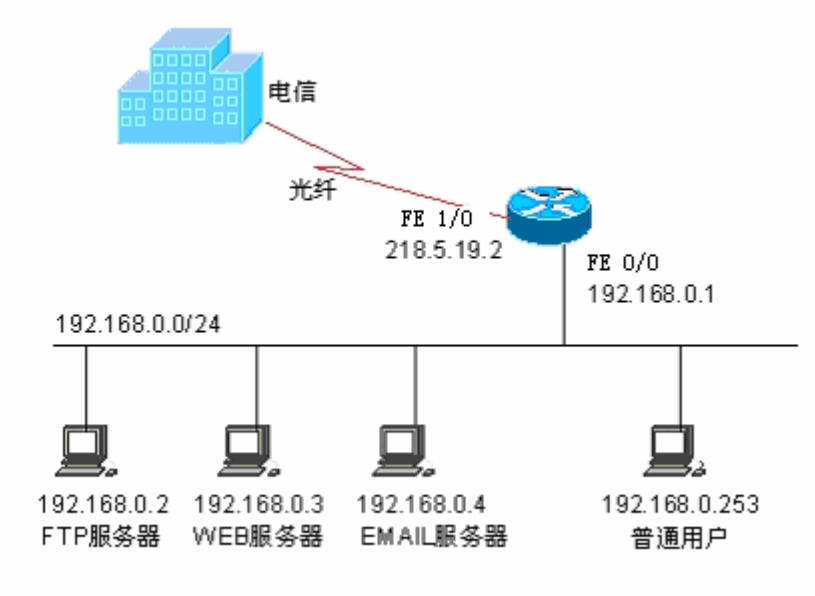
Ù ¾ Ŗ D

```
ip nat pool realhosts 10.10.10.2 10.10.10.3 netmask 255.255.255.0 type
rotary
ip nat inside destination list 100 pool realhosts
!
access-list 100 permit ip any host 10.10.10.100
!


Ruijie# sh ip nat translations
Pro Inside global   Inside local    Outside local          Outside global
tcp 10.10.10.100:23 10.10.10.2:23  100.100.100.100:1178
100.100.100.100:1178
tcp 10.10.10.100:23 10.10.10.3:23  200.200.200.200:1024
200.200.200.200:1024
```

ip default-route balance by-source



```
dialer idle-timeout 1200
dialer-group 1


bandwidth 1000
!




ip nat pool nbr_setup_build_pool prefix-length 24
address 218.5.19.2 218.5.19.2 match interface GigabitEthernet 1/0
address interface dialer 1 match interface dialer 1


ip nat inside source list 99 pool nbr_setup_build_pool


ip route 0.0.0.0 0.0.0.0 GigabitEthernet 1/0 202.101.98.1
ip route 0.0.0.0 0.0.0.0 dialer 1
!
```



2

```
Ruijie> enable

Ruijie# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.

Ruijie(config)#interface GigabitEthernet 1/0

Ruijie(config-if)# ip address 218.5.19.2 255.255.255.0

Ruijie(config-if)# ip nat outside

Ruijie(config-if)# no shut

Ruijie(config-if)# end
Ruijie#

%LINK CHANGED: Interface GigabitEthernet 1/0, changed state to up
```

```
%LINE PROTOCOL CHANGE: Interface GigabitEthernet 1/0, changed state to
UPRuijie# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.


Ruijie(config)# interface GigabitEthernet 0/0


Ruijie(config-if)# ip address 192.168.0.1 255.255.255.0


Ruijie(config-if)# ip nat inside


Ruijie(config-if)# no shut
Ruijie(config-if)# end
Ruijie#
%LINK CHANGED: Interface GigabitEthernet 0/0, changed state to up
%LINE PROTOCOL CHANGE: Interface GigabitEthernet 0/0, changed state to
UP
Ruijie# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.


Ruijie(config)# ip route 0.0.0.0 0.0.0.0 GigabitEthernet 1/0 218.5.19.1


Ruijie(config)# access-list 1 permit any


Ruijie(config)#ip nat inside source list 1 interface GigabitEthernet 1/0


Ruijie(config)# ip nat inside source static tcp 192.168.0.2 20 218.5.19.2
20
Ruijie(config)# ip nat inside source static tcp 192.168.0.2 21 218.5.19.2
21


Ruijie(config)# ip nat inside source static tcp 192.168.0.3 80 218.5.19.2
80


Ruijie(config)# ip nat inside source static tcp 192.168.0.4 25 218.5.19.2
25
```

```
Ruijie(config)# ip nat inside source static tcp 192.168.0.4 110
218.5.19.2 110
Ruijie(config)# end
Ruijie#
Ruijie# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.


Ruijie(config)# line vty 0 4
Ruijie(config-line)# password remoteuser
Ruijie(config-line)# end
Ruijie#
Ruijie# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# enable secret private


Ruijie(config)# host NBR
RUIJIE(config)# end
RUIJIE#


RUIJIE# write
Building configuration...
[OK]
RUIJIE#


RUIJIE# show running-config
Building configuration...
Current configuration:
!
!
hostname NBR
!
!
!
access-list 1 permit any
!
!
interface GigabitEthernet 0/0
ip address 192.168.0.1 255.255.255.0
ip nat inside
```

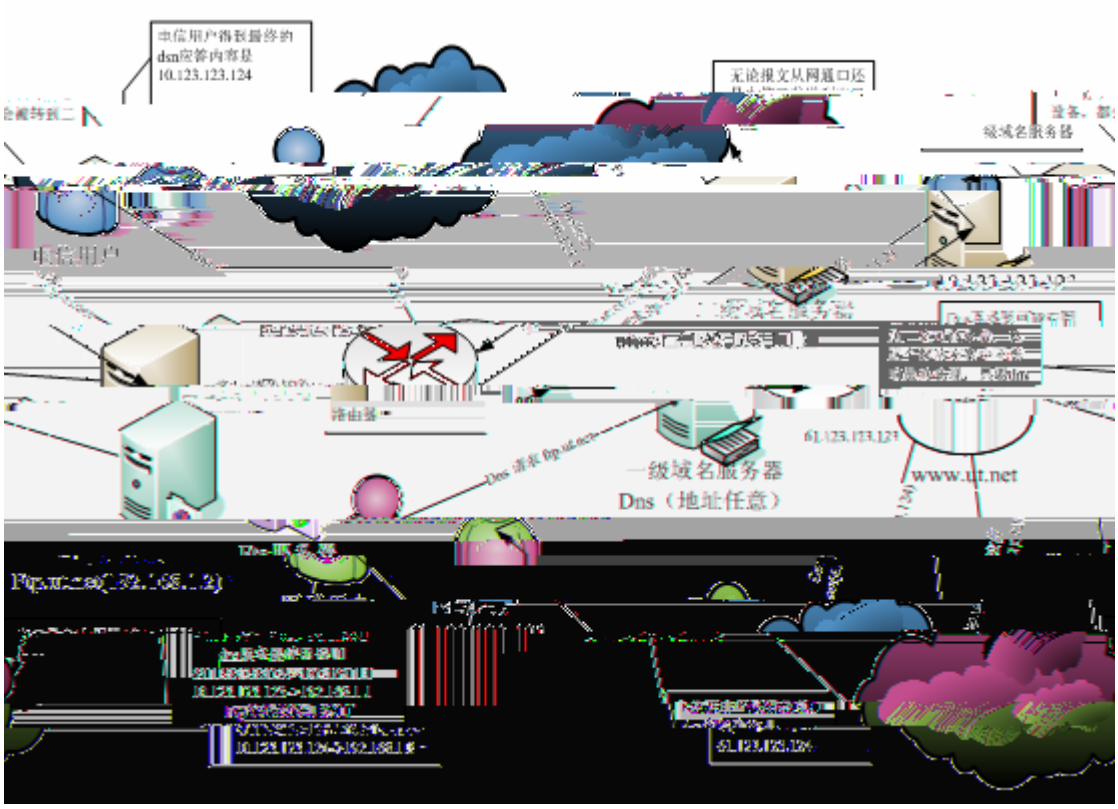
```
!
interface GigabitEthernet 1/0
ip address 218.5.19.2 255.255.255.0
ip nat outside
!
ip nat inside source list 1 interface GigabitEthernet 1/0
ip nat inside source static tcp 192.168.0.4 110 218.5.19.2 110
ip nat inside source static tcp 192.168.0.4 25 218.5.19.2 25
ip nat inside source static tcp 192.168.0.3 80 218.5.19.2 80
ip nat inside source static tcp 192.168.0.2 21 218.5.19.2 21
ip nat inside source static tcp 192.168.0.2 20 218.5.19.2 20
!
ip route 0.0.0.0 0.0.0.0 GigabitEthernet 1/0 218.5.19.1
!
line con 0
line vty 0 4
password remoteuser
login
!
end
RUIJIE#
```

```
!
interface GigabitEthernet 1/0
ip vrf forward 2
ip address 192.168.12.1 255.255.255.0
ip nat inside
!
interface GigabitEthernet 1/1
ip vrf forward 2
ip address 200.168.12.200 255.255.255.0
ip nat outside
!
ip nat pool net100 100.168.12.200 100.168.12.200 netmask 255.255.255.0
ip nat pool net200 200.168.12.200 200.168.12.200 netmask 255.255.255.0

ip nat inside source list 1 pool net100 vrf 1
ip nat inside source list 1 pool net200 vrf 2


Ruijie# show ip nat translations vrf 1
Pro Inside global     Inside local      Outside local     Outside
global
tcp 100.168.12.200:2063 192.168.12.65:2063 168.168.12.1:23
168.168.12.1:23
Ruijie# show ip nat translations vrf 2
Pro Inside global     Inside local      Outside local     Outside
global
tcp 200.168.12.200:2063 192.168.12.65:2063 168.168.12.1:23
168.168.12.1:23
```

```
       192.168.12.0                  200.198.12.0
```

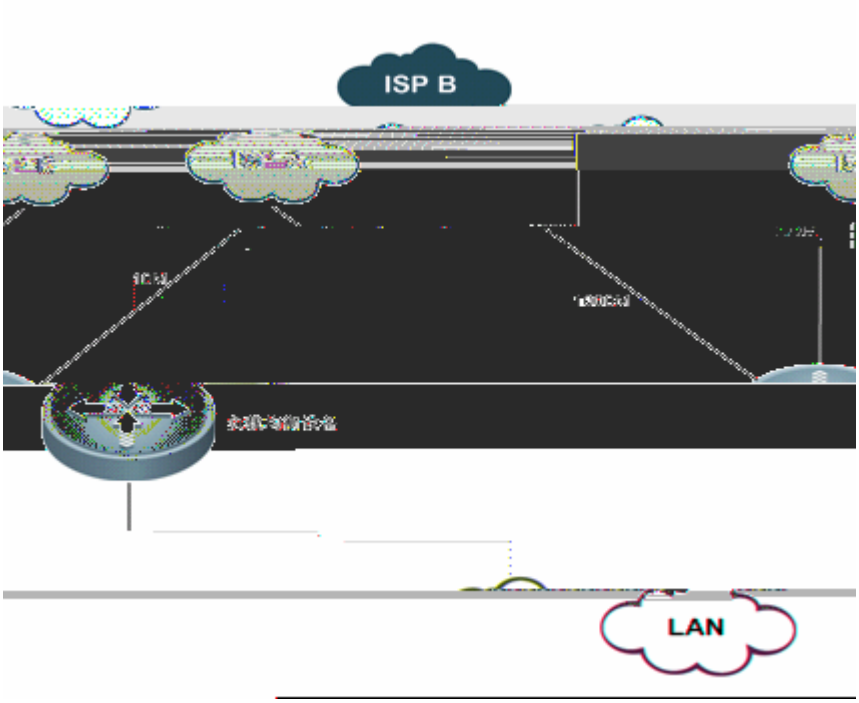
```
!
interface GigabitEthernet 0/0
ip address 192.168.12.1 255.255.255.0
ip nat inside
!
interface GigabitEthernet 1/0
ip address 200.198.12.1 255.255.255.0
```

```
ip nat outside
!
ip nat inside source static 192.168.12.0 200.198.12.0 netmask
255.255.255.0
```



19

19.1



2.

19.1.1

19.1.2

19.1.3

19.2

19.3

Â
Â

- Â _____
- Â _____
- Â _____
- Â _____

- Â _____

19.3.1 /

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# bandwidth 1000
```

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# no bandwidth
```

19.3.3

Step 1	**configure terminal**	
Step 2	**mllb threshold** *percent*	*percent*
	no mllb threshold	

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# mllb threshold 95
```

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# no mllb threshold
```

19.3.4

“ ”

Step 1

19.3.6 IP

Step 1	**configure terminal**	
Step 2	**mllb load-sharing original**	
	no mllb load-sharing original	

ﻍﻮ - ч

gigabitEthernet 0/1

gigabitEthernet 0/2　*gigabitEthernet 0/3*

3.

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# mllb enable
```

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
#
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# bandwidth 1000000
```

```
Ruijie# exit
#       1
Ruijie(config)# interface gigabitEthernet 0/2
Ruijie(config-if)# bandwidth 100000
Ruijie# exit
#       2
Ruijie(config)# interface gigabitEthernet 0/3
Ruijie(config-if)# bandwidth 10000
Ruijie# exit



Ruijie(config)#
```

20

20.1

20.1.1

20.1.2

“ ”

“ ”

20.2

20.3

Â

20.3.1

configure terminal	
layer23 classify enable	
end	
show running	

no layer23 classify enable

```
Ruijie#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)#layer23 classify enable
Ruijie(config)#end
```

20.4 vlan

Â

20.4.1 vlan

Step 1	**configure terminal**	
Step 2	**vlan-group** *name* **vlan** *vid-list*	
Step 3	**end**	
Step 4	**show vlan-group**	

no vlan-group *name*

vlan-enable

“ ”

“ ”

“ ”

“ ”

```
Ruijie#configure terminal
Ruijie(config)#vlan-group vlan-group1 vlan 1,3,7-9
Ruijie(config)#end
```

20.5 vlan

show vlan-group *group name*	

“ ”

subscriber import txt

20.8

Â

20.8.1

Step 1	**configure terminal**	
Step 2	**network-group name** *name* **{ip-host** *ip-addr* **| ip-subnet** *subnet mask* **| ip-range** *start end***] }**	
Step 3	**end**	
Step 4	**show network-group**	

no network-group *name*

“ ”

“ ”

```
Ruijie#configure terminal
Ruijie(config)# network-group name network1 ip-subnet 192.168.196.0
255.255.255.0
                end
```

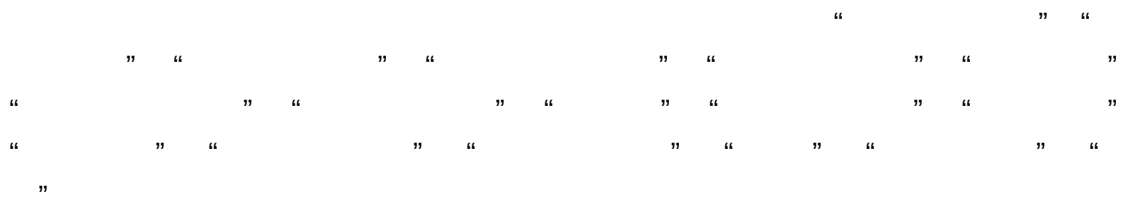
20.9

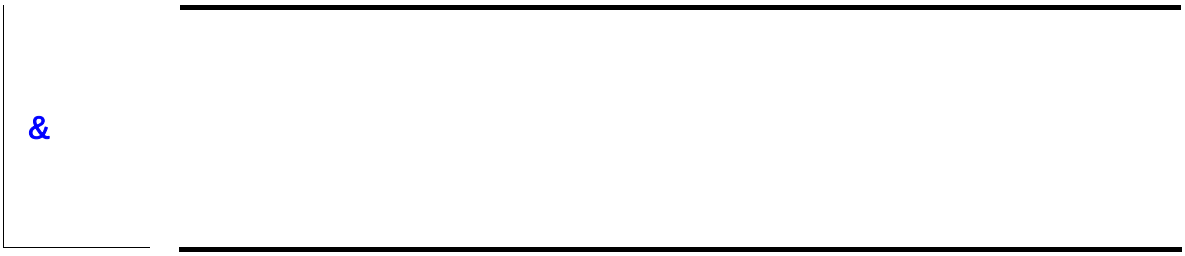
21

21.1

21.1.1

21.1.2





ǰ

&

21.3.1

Step 1	**configure terminal**	
Step 2	**identify-application enable**	

21.3.3

Step 1	**configure terminal**	
Step 2	**identify-application custom name** *app-name* **class** *class-name* **{tcp|udp} sport** *sport-low sport-high* **dport** *dport-low dport-high*	
Step 4	**end**	
Step 5	**show identify-application userdef-rule**	

no identify-application custom name *app-name* **class** *class-name* **{tcp|udp} sport** *sport-low sport-high* **dport** *dport-low dport-high*

```
Ruijie#show identify-application userdef-rule
TYPE  NAME              CLASS             SPL    SPH    DPL    DPH
TCP                                       1      10      1      100



Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# identify-application custom name myqq class im  udp
sport 1 10 dport any any
Ruijie#end
Ruijie#*Jan 11 17:25:29: %SYS-5-CONFIG_I: Configured from console by
console
Ruijie#show identify-application userdef-rule
TYPE  NAME              CLASS             SPL    SPH    DPL    DPH
TCP                                       1      10     1      100
UDP   myqq                                1      10     any    any
```

21.3.4

no identity-application key *app-name*

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# identify-application key FTP
Ruijie(config)#
```

21.3.5

Step 1	**configure terminal**	
Step 2	**identify-application inhibitive** *app-name*	
Step 4	**end**	
Step 5	**show identity-application inhibitive**	

no identity-application inhibitive *app-name*

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# identify-application key     QQ
Ruijie(config)#
```

21.3.6

show identify-application version	
show identity-application userdef-rule	
show identity-application	

show identity-application key	
show identity-application inhibitive	
show identity-application class	
show identity-application group-state	

```
Ruijie# show identify-application custom version
 Version  1.0
Date  2010-1-8
```

```
Ruijie#show identify-application userdef-rule
TYPE  NAME              CLASS             SPL    SPH    DPL    DPH
TCP                                       1      10     1      100
UDP   myqq                                1      10     any    any
```

```
Ruijie#show identity-application
any 255-4095-63-48
              1-0-0-0
              1-1-0-0
       MSN 1-6-0-0
           MSN-CHAT 1-6-1-0
           MSN-AUDIO 1-6-2-0
           MSN-FILE 1-6-3-0
           MSN-     1-6-4-0
           MSN-     1-6-5-0
          QQ 1-7-0-0
           QQ-CHAT 1-7-1-0
           QQ-     1-7-2-0
           QQ-        1-7-3-0
           QQ-        1-7-4-0
           QQ-     1-7-5-0
           QQ-     1-7-14-0
       WEBIM 1-9-0-0
           MSN-WEBIM 1-9-1-0
           YAHOO-WEBIM 1-9-2-0
```

```
Ruijie#show identity-application key
IP
    QQ
MSN


Ruijie#show identity-application inhibitive




Ruijie#show identity-application class
           1-0-0-0
IP        2-0-0-0
           3-0-0-0
             4-0-0-0
P2P        5-0-0-0
        6-0-0-0
HTTP     7-0-0-0
             8-0-0-0
           9-0-0-0
      10-0-0-0
           11-0-0-0
        12-0-0-0
        13-0-0-0
           14-0-0-0
        15-0-0-0
RFC 16-0-0-0
    17-0-0-0
         248-0-0-0


Ruijie#show identity-application group-state
```

```
app group state: on  //on
```

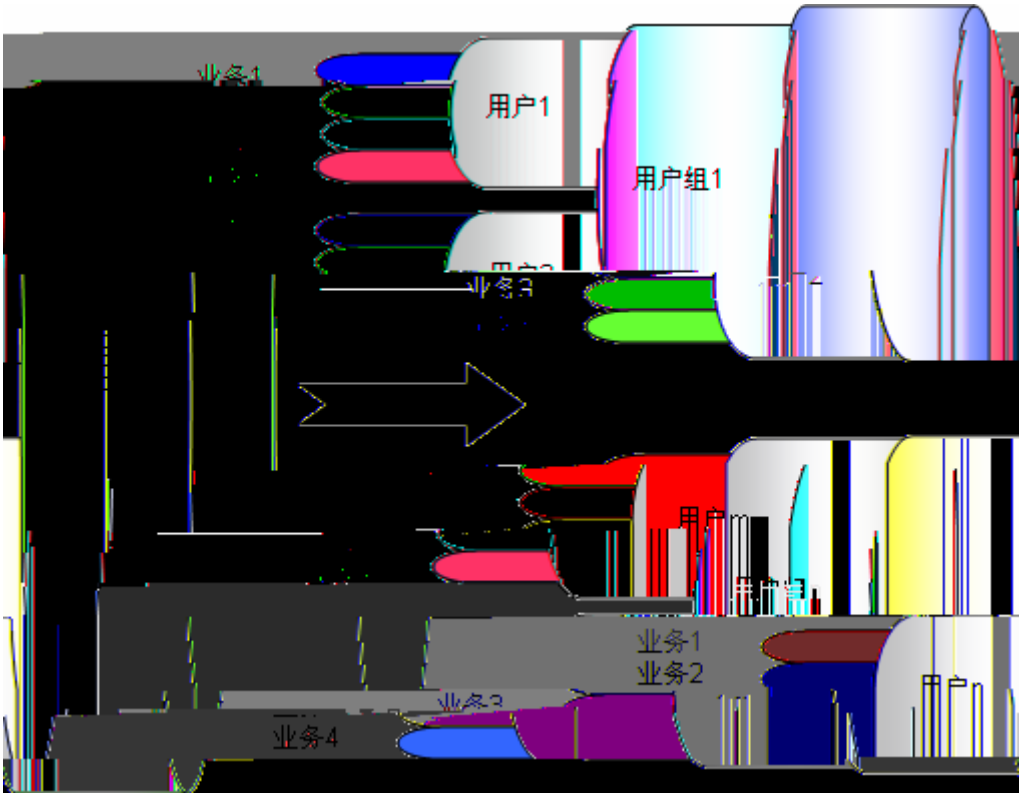
21.4

22

22.1

22.1.1

22.1.2



22.1.2.1.1

22.1.2.1.2

cir **pir** **pir** **cir**
cir **pir** **pir**
cir
cir
pir

22.1.2.1.3

&

22.1.2.1.4

&

- VID
-
-
-

22.2

Â

Â

22.3.1

Step 1	**configure terminal**	
Step 2	**flow-control** *Name*	
Step 3	**show running**	

no flow-control *Name*

&

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# flow-control DianXin
Ruijie(config-flow-control))# end
```

22.3.2

Step 1	**configure terminal**	
Step 2	**flow-control** *Name*	
Step 3	**exit**	**flow-control**
Step 4	**interface Gi** *0/1*	
Step 5	**flow-policy** *Name*	
Step 6	**end**	
Step 7	**show running**	

ض

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# flow-control DianXin
Ruijie(config-flow-control)# channel-tree inbound
Ruijie(config-channel-tree)#exit
Ruijie(config-flow-control)# channel-tree outbound
Ruijie(config-channel-tree)#end
```

22.3.4

Step 1	**configure terminal**	
Step 2	**flow-control** *Name*	
Step 3	**channel-tree inbound**	
Step 4	**channel-group** *name* **parent NULL** *parent_name* **cir** *cir_num* **pir** *pir_num* **pri** *pri_num* **schedule-type fifo sfq per-net per-mask** *mask* **per-cir** *pcir_num* **per-pir** *ppir_num* **limit** *limit_num*	
Step 6	**end**	
Step 7	**show running**	

channel-tree **no channel-group** *Name*

cir **pir**

cir **cir** **cir**

cir **pir** A ^

&

root

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# flow-control DianXin
Ruijie(config-flow-control)# channel-tree inbound
Ruijie(config-channel-tree)# channel-group root parent null cir 100000
pir 100000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# end
```

22.3.5

Step 1	**configure terminal**	
Step 2	**flow-control** *Name*	
Step 3	**channel-tree inbound**	
Step 4	**channel-default** *channel*	
Step 6	**end**	
Step 7	**show running**	

	channel-tree	**no channel-default**
&	**no channel-default**	

depart1

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# flow-control DianXin
Ruijie(config-flow-control)# channel-tree inbound
Ruijie(config-channel-tree)# channel-default depart1
Ruijie(config-channel-tree)# end
```

22.3.6

Step 1	**configure terminal**	
Step 2	**flow-control** *Name*	
Step 3	**flow-rule** *num* **vlan-group** *vlan-group-name* **subscriber** *subscriber-name* **network-group** *network-group-name* **app-group** *app-group-name* **time-range** *time-rang-name*	
Step 4	**flow-rule** *num* **session-limit** *session-num* **action {drop | log-drop | pass [in-channel** *in-channel-name***] [out-channel** *out-channel-name***]} [commet** *string***]**	
Step 6	**end**	
Step 7	**show running**	

flowl-control **no flow-rule** *num*

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# flow-control DianXin
Ruijie(config-flow-control)# flow-rule 1 vlan-group any subscriber
```

Step 1	**configure terminal**	
Step 2	**flow-control** *Name*	
Step 3	**change-priority** **rule1** *rule1-pri-num* **rule2** *rule2-pri-num*	
Step 4	**end**	
Step 5	**show running**	

&	

```
Ruijie# configure terminal
```

```
Ruijie#show flow-control test inbound
group-name                      cir     pir     pri  schedule
------------------------------- -------- -------- ---- --------
root                           1000000  1000000  4    fifo
part1                          700000   1000000  4    fifo
part2                          200000   1000000  4    fifo
part3                          100000   1000000  4    fifo
```

22.5

show flow-control-policy *group*	

```
Ruijie#show flow-control-policy group
group_name                      group_id  apply_ifx    policy_entries
group1                          0         6            14
group2                          1         0            4
```

22.6

show flow-control-policy rule [group *name***]**	

```
Ruijie#show flow-control-policy rule
Pri_num grp_id rule_num ifx   vlan_id    subs_id    net_wk_id  app_id
ichl_id ochl_id ses_num ses_lim effec
1       0       1         0      0          814695740   0          0
NA      2       0        2000    0
```

```
2       0       2         0     18661884    18577704    18577496   0
1       NA      0        2000     0
3       1      3           6       18661884      18577704     18577496
4294967290
1       1       0        2000     1
```

```
Ruijie#show flow-control-policy rule group DianXin
Pri_num grp_id rule_num ifx   vlan_id    subs_id    net_wk_id  app_id
ichl_id ochl_id ses_num ses_lim effec
1       0       1         0      0          814695740   0          0
NA      2       0        2000     0
2       0       2         0     18661884    18577704    18577496   0
1       NA      0        2000     0
```

22.7

22.7.1

22.7.2

Â

Â

Â

Â

22.7.3

1

```
Ruijie# configure terminal
```

```
#
Ruijie(config)# flow-control Corp
#
Ruijie(config-flow-control)# channel-tree inbound
Ruijie(config-channel-tree)# channel-group root parent null cir 10000
pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# channel-group department1 parent root cir
5000 pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# channel-group department2 parent root cir
3000 pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# channel-group department3 parent root cir
2000 pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# exit
#
Ruijie(config-flow-control)# channel-tree outbound
Ruijie(config-channel-tree)# channel-group root parent null cir 10000
pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# channel-group department1 parent root cir
5000 pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# channel-group department2 parent root cir
3000 pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# channel-group department3 parent root cir
2000 pir 10000 pri 4 schedule-type fifo
Ruijie(config-channel-tree)# exit
Ruijie(config-flow-control)# exit



Ruijie# configure terminal


Ruijie(config)# identify-application enable


Ruijie(config)# subscriber static name department1 parent / ip-subnet
192.168.1.0 255.255.255.0
Ruijie(config)# subscriber static name department2 parent / ip-subnet
192.168.2.0 255.255.255.0
Ruijie(config)# subscriber static name department3 parent / ip-subnet
192.168.3.0 255.255.255.0
#             any              any
Ruijie(config)# time-range any
Ruijie(config-time-range)# periodic Daily 0:00 to 23:59
```

```
Ruijie# configure terminal
Ruijie(config)# flow-control Corp

Ruijie(config-flow-control)# flow-rule 1 vlan-group any subscriber department1 network-group any app-group any time-rang any
Ruijie(config-flow-control)# flow-rule 1 session-limit 0 action pass in-channel department1 out-channel department1
Ruijie(config-flow-control)# flow-rule 2 vlan-group any subscriber department2 network-group any app-group any time-rang any
Ruijie(config-flow-control)# flow-rule 2 session-limit 0 action pass in-channel department2 out-channel department2
Ruijie(config-flow-control)# flow-rule 3 vlan-group any subscriber department3 network-group any app-group any time-rang any
Ruijie(config-flow-control)# flow-rule 3 session-limit 0 action pass in-channel department3 out-channel department3

Ruijie# configure terminal
Ruijie(config)# interface GigabitEthernet 0/1
Ruijie(config-if-GigabitEthernet 0/1)# flow-policy Corp
```

23

23.1

23.1.1

23.1.2

23.2

23.3

- Â
- Â
- Â

23.3.1

Step 1	**configure terminal**	
Step 2	**flow-audit enable**	
Step 3	**end**	
Step 4	**show running**	

show online statistics interface *interface-name* **| bridge** *bridge-name* **detail|recent** *hour* **| time-interval** *begin-year begin-month begin-day begin-hour* **to** *end-year end-month end-day end-hour*	

show flowrate channel channel-name *channel-name* **channel-group** *channel-group* **recent** *hour* **| time-interval** *begin-year begin-month begin-day begin-hour* **to** *end-year end-month end-day end-hour* **day-interval** *begin-year begin-month begin-day* **to** *end-year end-month end-day* **hour-interval** *begin-hour* **to** *end-hour begin-hour2* **to** *end-hour2* **order-by pass drop upload download desc asc top** *n*	
show flowrate interface *interface-name* **recent** *hour* **| time-interval** *begin-year begin-month begin-day begin-hour* **to** *end-year end-month end-day end-hour* **detail**	
show flowrate ip interface *interface-name* **| bridge** *bridge-name* **subscriber-group** *subscriber-group* **by-group subscriber** *subscriber-name* **ip** *ip-address* **application** *application-name* **application-group** *application-group* **application-type** *application-type* **day-interval** *begin-year begin-month begin-day* **to** *end-year end-month end-day* **hour-interval** *begin-hour1* **to** *end-hour1 begin-hour2* **to** *end-hour2* **order-by pass drop upload download ip subscriber desc asc top** *n* **detail**	
show flowrate application interface *interface-name* **| bridge** *bridge-name* **subscriber-group** *subscriber-group* **subscriber** *subscriber-name* **ip**	

show flowrate ip-application interface *interface-name* **|** **bridge** *bridge-name*

24

24.1 Ping

ping *ip address* **length** *length* **ntimes** *times* **data** *data* **source** *source* **timeout** *seconds*	**Ping**

‘ ’ ‘ ’

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

```
Success rate is 100 percent (100/100), round-trip min/avg/max = 2/2/3
ms
Ruijie#
```

24.2 Traceroute

Traceroute

Traceroute

Traceroute

traceroute *protocol destination* **probe** *probe* **ttl** *minimum maximum* **source** *source* **timeout** *seconds*	

```
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
```

```
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
```

24.3 line-detect

interface *interface*	
line-detect	

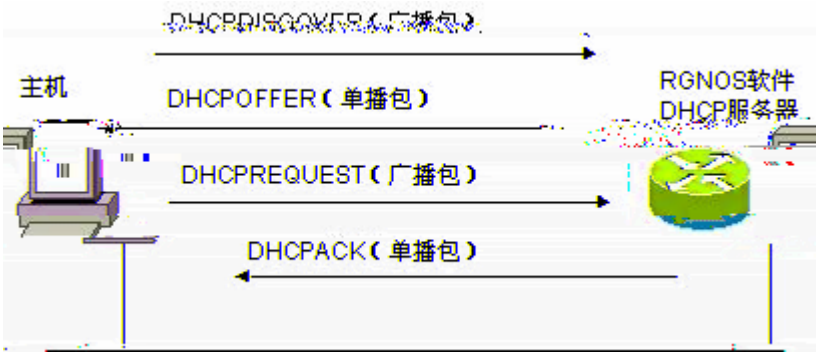
```
Ruijie(config)#int gigabitEthernet 3/1
Ruijie(config-if)#line-detect
start cable-diagnoses,please wait...
cable-daignoses end!this is result:
4 pairs
pair state     length(meters)
---- ---------- --------------
A     Ok          2
B     Ok          1
C     Short       1
D     Short       1
```


}

25 DHCP

25.1 DHCP

25.2 DHCP



1 DHCP

&

25.4 DHCP

25.5 DHCP

-
-
-
-
-
-
-
-
-
-

25.5.1 DHCP

service dhcp	
no service dhcp	

&

service dhcp

service dhcp

25.5.2 DHCP

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

25.5.3 DHCP

،

،

،

،

،

،

،

،

،

،

،

ip dhcp pool *dhcp-pool*	

bootfile *filename*	

default-router *address address2…address8*	

lease *days hours] minutes* **infinite**	

domain-name *domain*	

dns-server *address*

address2…address8

network *network-number mask*	

&

25.5.4

ip dhcp pool *name*	
host *address*	

hardware-address *hardware-address type* **client-identifier** *unique-identifier*	
client-name *name*	

25.5.5 Ping

ip dhcp ping
packets *number*

ip address dhcp	

25.5.8 PPP DHCP

ip address dhcp	

25.5.9 FR DHCP

ip address dhcp	

25.5.10 HDLC DHCP

ip address dhcp	

&

25.6


```
ip dhcp pool Billy
host 172.16.1.101 255.255.255.0
hardware-address 00d0.df34.32a3 ethernet
client-name Billy
default-router 172.16.1.254
domain-name rg.com
dns-server 172.16.1.253
netbios-name-server 172.16.1.252
netbios-node-type h-node
```

25.7.3 DHCP

26 DHCP Relay

26.1

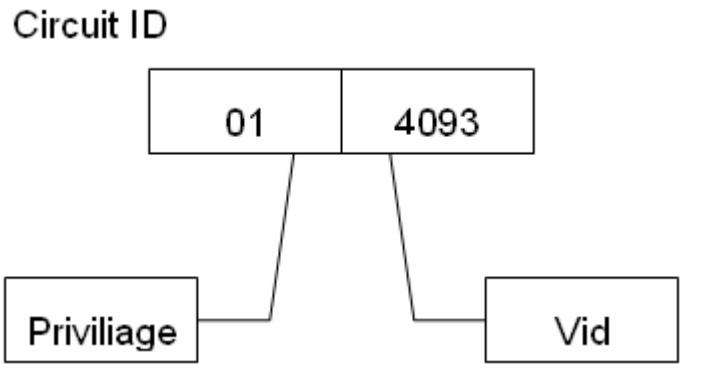
26.1.1 DHCP

26.1.2 DHCP DHCP Relay Agent

1

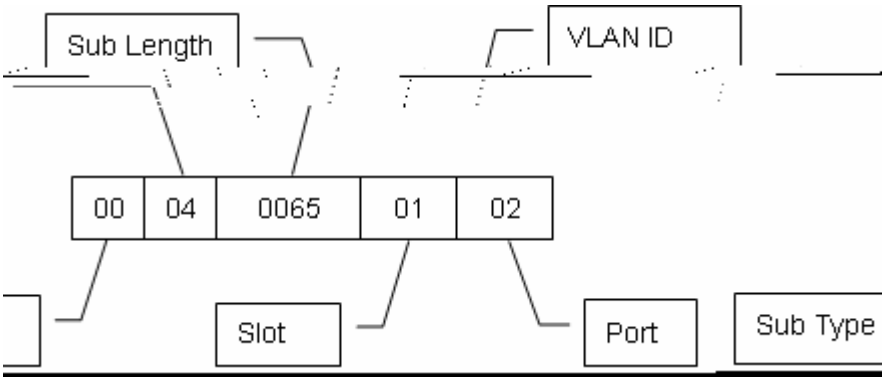
26.1.3 DHCP Relay Agent Information(option 82)

R e m o t



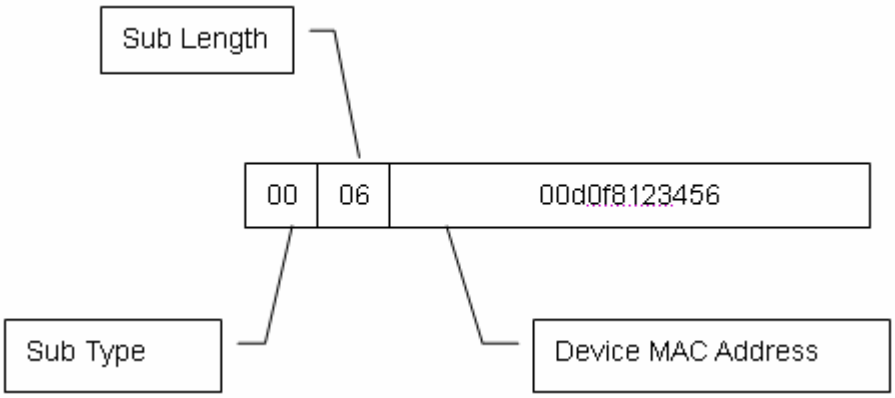
2

Agent Circuit ID



3

Agent Remote ID



4

26.1.4 DHCP relay Check Server-id

26.2 DHCP

26.2.1 DHCP

service dhcp	
no service dhcp	

26.2.2 DHCP Server IP

ʌ é ζ ط Ś é

no IP helper-address vrf *A.B.C.D*	

26.2.3 DHCP option dot1x

ip dhcp relay information option dot1x

ip dhcp relay information option dot1x	
no ip dhcp relay information option dot1x	

26.2.4 DHCP option dot1x access-group

ip dhcp relay information option dot1x access-group *acl-name* *acl-name*

```
Ruijie# config
Ruijie(config)# ip access-list extended DenyAccessEachOtherOfUnauthrize
Ruijie(config-ext-nacl)# permit ip any host 192.168.3.1

Ruijie(config-ext-nacl)# permit ip any host 192.168.4.1
```

```
Ruijie(config-ext-nacl)# permit ip any host 192.168.5.1
Ruijie(config-ext-nacl)# permit ip host 192.168.3.1 any

Ruijie(config-ext-nacl)# permit ip host 192.168.4.1 any
Ruijie(config-ext-nacl)# permit ip host 192.168.5.1 any
Ruijie(config-ext-nacl)# deny ip 192.168.3.0 0.0.0.255 192.168.3.0
 0.0.0.255

Ruijie(config-ext-nacl)# deny ip 192.168.3.0  0.0.0.255  192.168.4.
0  0.0.0.255
Ruijie(config-ext-nacl)# deny ip 192.168.3.0  0.0.0.255  192.168.5.
0  0.0.0.255
Ruijie(config-ext-nacl)# deny ip 192.168.4.0  0.0.0.255  192.168.4.
0  0.0.0.255
Ruijie(config-ext-nacl)# deny ip 192.168.4.0  0.0.0.255  192.168.5.
0  0.0.0.255
Ruijie(config-ext-nacl)# deny ip 192.168.5.0  0.0.0.255  192.168.5.
0  0.0.0.255
Ruijie(config-ext-nacl)# deny ip 192.168.5.0  0.0.0.255  192.168.3.
0  0.0.0.255
Ruijie(config-ext-nacl)# deny ip 192.168.5.0  0.0.0.255  192.168.4.
0  0.0.0.255
Ruijie(config-ext-nacl)# exit
```

ip dhcp relay information option dot1x access-group *DenyAccessEachOtherOfUnauthrize*

DHCP option dot1x access-group

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

26.2.5 DHCP option 82

ip dhcp relay information option82

DHCP Relay Agent Information option

```
Ruijie# configure  terminal
Ruijie(config)# service dhcp
Ruijie(config)# ip helper-address 192.18.100.1
Ruijie(config)# ip helper-address192.18.100.2
Ruijie(config)# interface GigabitEthernet 0/3
Ruijie(config-if)# ip helper-address 192.18.200.1

Ruijie(config-if)# ip helper-address 192.18.200.2

Ruijie(config-if)# end
```

26.3 DHCP relay

26.3.1 DHCP option dot1x

dhcp option82

26.3.2 DHCP option82

dhcp option dot1x

26.4 DHCP

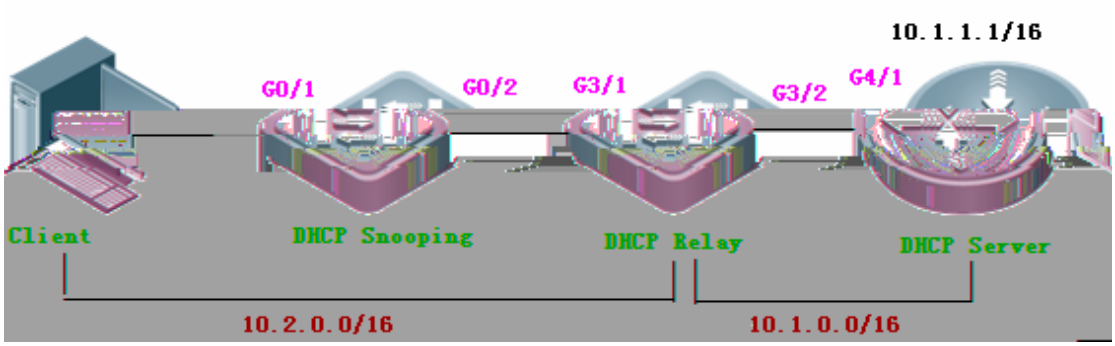
show running-config

```
Ruijie# show running-config
Building configuration...
Current configuration : 1464 bytes
version RG0S 10.1.00(1), Release(11758)(Fri Mar 30 12:53:11 CST 2007
-nprd
```

```
hostname Ruijie
vlan 1
ip helper-address 192.18.100.1
ip helper-address 192.18.100.2
ip dhcp relay information option dot1x
interface GigabitEthernet 0/1
interface GigabitEthernet 0/2
interface GigabitEthernet 0/3
no switchport
ip helper-address 192.168.200.1
ip helper-address 192.168.200.2
interface VLAN 1
ip address 192.168.193.91 255.255.255.0
line con 0
exec-timeout 0 0
line vty 0
exec-timeout 0 0
login
password 7 0137
line vty 1 2
login
password 7 0137
line vty 3 4
login
end
```

26.5 DHCP

26.5.1 IP


10.1.1.1/16
G0/1
G0/2
G3/1
G3/2
G4/1
Client
DHCP Snooping
DHCP Relay
DHCP Server
10.2.0.0/16
10.1.0.0/16

```
Ruijie(config)# ip route 10.1.0.0 255.255.0.0 10.2.1.1
```

、

```
Ruijie(config)# server dhcp

Ruijie(config)# ip helper-address 10.1.1.1

Ruijie(config)# interface gigabitEthernet 3/1
Ruijie(config-if)# no switchport
Ruijie(config-if)# ip address 10.2.1.1 255.255.0.0

Ruijie(config)# interface gigabitEthernet 3/2
Ruijie(config-if)# no switchport
Ruijie(config-if)# ip address 10.1.0.1 255.255.0.0
```

、

```
Ruijie(config)# interface gigabitEthernet 4/1
Ruijie(config-if)# no switchport
Ruijie(config-if)# ip address 10.1.1.1 255.255.0.0

Ruijie(config)# service dhcp

Ruijie(config)# ip dhcp excluded-address 10.1.1.1 10.1.1.10

Ruijie(config)# ip dhcp pool linwei

Ruijie(dhcp-config)# default-router 10.2.1.1

Ruijie(dhcp-config)# network 10.2.0.0  255.255.0.0

Ruijie(config)# ip route 10.2.0.0  255.255.0.0  10.1.0.1
```

27 DNS

27.1 DNS

27.2

27.2.1 DNS

27.2.2 DNS

clear host *word*	

27.2.6

# show hosts	

```
Ruijie# show hosts
DNS name server    :
192.168.5.134    static
     host                type          address
www.163.com              static       192.168.5.243
www.ruijie.com           dynamic      192.168.5.123
```

27.2.7

Ping

```
Ruijie# ping www.ietf.org
Resolving host[www.ietf.org]
Sending 5,100-byte ICMP Echos to 192.168.5.123,
timeout is 2000 milliseconds.
!!!!!
Success rate is 100 percent(5/5)
Minimum = 1ms Maximum = 1ms, Average = 1ms
```

28 NTP

28.1 NTP

28.2 NTP

ntp authenticate	
no ntp authenticate	

ntp authentication-key **ntp trusted-key** Ä ò

28.2.3 NTP ID

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

28.2.4 NTP

ntp server *ip-addr* **version** *version* **source** *if-name number* **key** *keyid* **prefer**	
no ntp server *ip-addr*	

28.2.5 NTP

interface *interface-type number*	
ntp disable	

no ntp disable

28.2.6 NTP

no ntp

no ntp	
ntp authenticate **ntp server** *ip-addr* **version** *version* **source** *if-name number* **key** *keyid* **prefer**	

28.2.7 NTP

ntp synchronize	
no ntp synchronize	

28.2.8 NTP

ntp update-calendar	

no ntp update-calendar	

28.2.9 NTP

&

“ ” “ ”

……

ntp master *stratum*	
no ntp master	

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

28.2.10 NTP

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**
- **serve**
- **serve-only**
- **query-only**
- *access-list-number*
- *access-list-name*

```
Ruijie# show ntp status
Clock is synchronized, stratum 9, reference is 192.168.217.100
nominal freq is 250.0000 Hz, actual freq is 250.0000 Hz, precision
is 2**18
reference time is AF3CF6AE.3BF8CB56 (20:55:10.000 UTC Mon Mar 1 1993)
clock offset is 32.97540 sec, root delay is 0.00000 sec
root dispersion is 0.00003 msec, peer dispersion is 0.00003 msec
```

28.4

```
Ruijie(config)# no ntp
Ruijie(config)# ntp authentication-key 6 md5 wooooop
Ruijie(config)# ntp authenticate
Ruijie(config)# ntp trusted-key 6
Ruijie(config)# ntp server 192.168.210.222 key 6
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# ntp disable
Ruijie(config-if)# no ntp disable
```

```
Ruijie(config)# no ntp
Ruijie(config)# ntp authentication-key 6 md5 wooooop
Ruijie(config)# ntp authenticate
Ruijie(config)# ntp trusted-key 6
Ruijie(config)# ntp server 10::4 key 6
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# ntp disable
Ruijie(config-if)# no ntp disable
```

29 (SNTP)

29.1

29.2 SNTP

29.2.1 SNTP

	0

29.2.2 SNTP

```
Ruijie# config
```

“ ”

“ ”

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

```
Ruijie(config)# End
```

```
Ruijie# show running-config
```

```
Ruijie# copy running-config startup-config
```

no sntp enable

29.2.3 NTP Server

```
Ruijie# config
```

```
Ruijie# config
```

```
Ruijie(config)# clock time-zone <time-zone>
```

```
Ruijie(config)# End
```

```
Ruijie# show running-config
```

```
Ruijie# copy running-config startup-config
```

no clock time-zone

29.3 SNTP

```
Ruijie# show sntp
```

show sntp

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

30 SSH

30.1 SSH

30.2 SSH

	SSH1	SSH2

30.3 SSH

30.4 SSH

30.4.1 SSH

30.4.2

configure terminal	
no enable service ssh-server	

30.4.5 SSH server

configure terminal	
ip ssh version 1 | 2	
no ip ssh version	

30.4.6 SSH

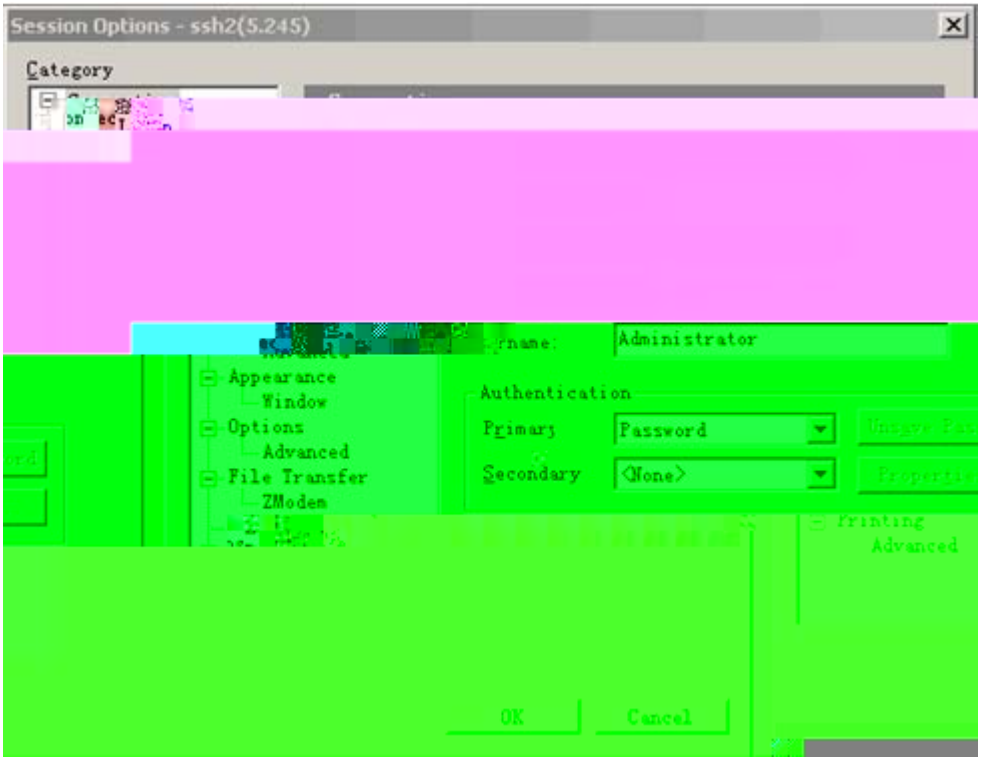
configure terminal	
ip ssh time-out *time*	
no ip ssh time-out	

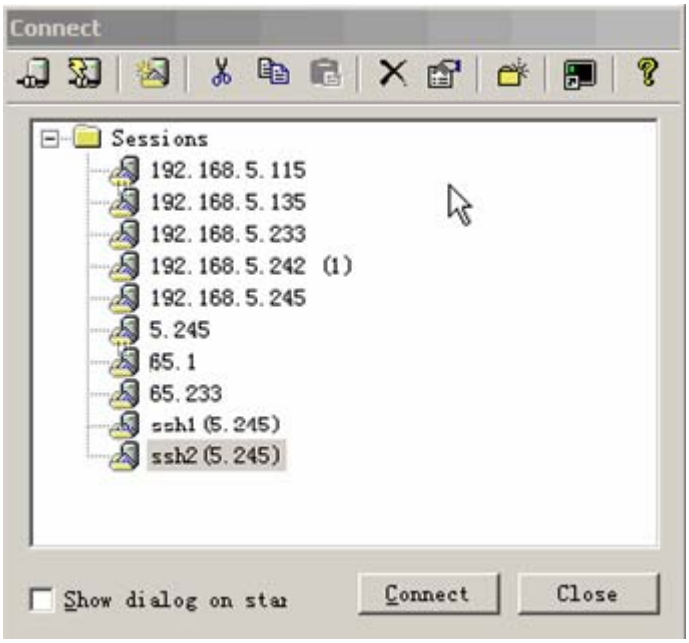
30.4.7 SSH

configure terminal	

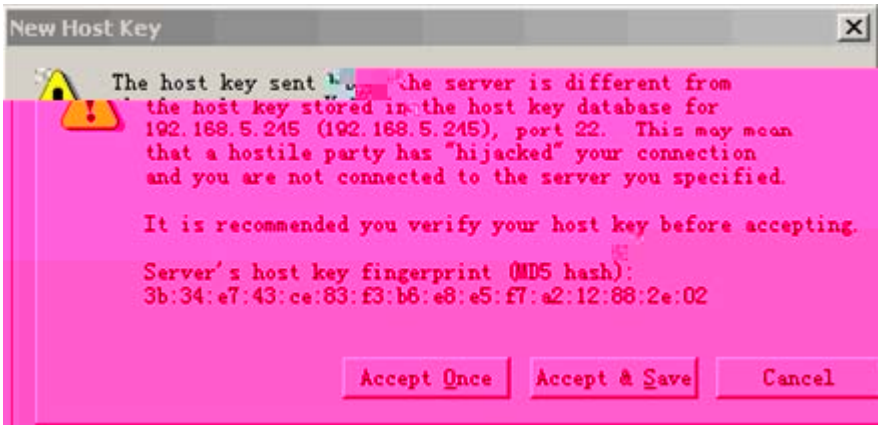
ip ssh authentication-retries *retry times*	
no ip ssh authentication-retries	

30.5 SSH




Connect
Sessions
192.168.5.115
192.168.5.135
192.168.5.233
192.168.5.242 (1)
192.168.5.245
5.245
65.1
65.233
ssh1 (5.245)
ssh2 (5.245)
Show dialog on star
Connect
Close

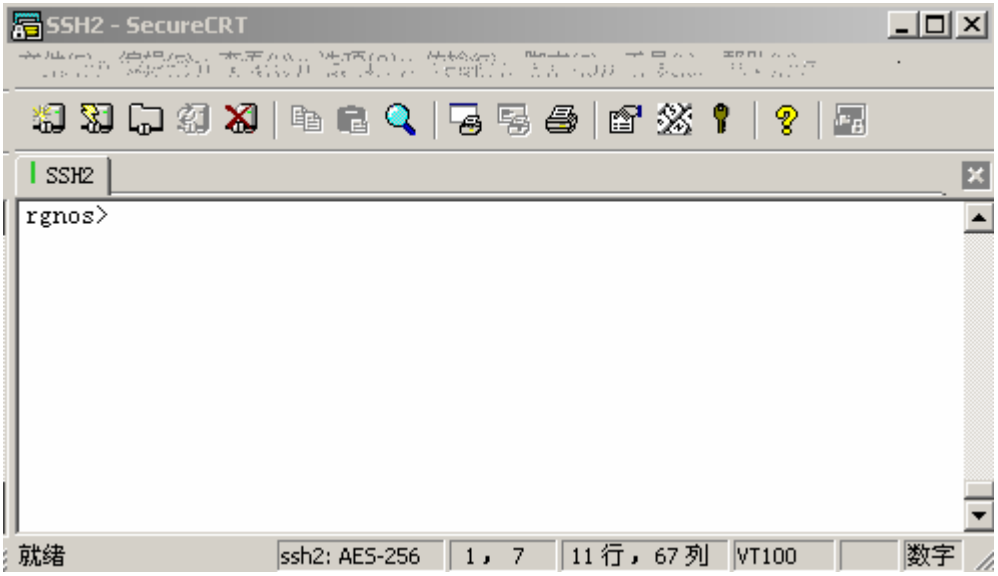
2


New Host Key
The host key sent
he server is different from
the host key stored in the host key database for
192.168.5.215 (192.168.5.215), port 22. This may mean
that a hostile party has "hijacked" your connection
and you are not connected to the server you specified.
It is recommended you verify your host key before accepting.
Server's host key fingerprint (MD5 hash):
3b:34:e7:43:ce:83:f3:b6:e8:e5:f7:a2:12:88:2e:02
Accept Once
Accept & Save
Cancel

3

Я . Ї

4



5

31 UDP-Helper

31.1 UDP-Helper

31.1.1 UDP-Helper

&

31.2 UDP-Helper

31.2.1 UDP-Helper

31.2.2 UDP-Helper

[redacted]	udp-helper enable

no udp-helper enable

&

31.2.3

[redacted]

[redacted]

ip forward-protocol

udp *ID*

Ω ᾽ ᾽

32

route-map *route-map-name* **permit** **deny** *sequence*	

no **route-map** *route-map-name*

set ip default next-hop *ip-address weight ip-address weight*	
set ip next-hop *ip-address weight ip-address weight*	
set interface *intf_name*	
set default interface *intf_name*	
set ip precedence	
set ip tos	
set ip dscp	

ip policy route-map *name*	
no ip policy route-map	

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

```
Ruijie(config)# access-list 1 permit any
```

```
Ruijie(config)# route-map name
Ruijie(config-route-map)# match ip address 1
Ruijie(config-route-map)# set ip next-hop 192.168.5.5
Ruijie(config-route-map)# int GigabitEthernet 0/0
Ruijie(config-if)# ip policy route-map name
```

ip policy load-balance Redundance	
no ip policy	

no ip policy route-map

ip local policy route-map

match ip address

match length

set ip next-hop

set ip default next-hop

set interface

set default interface

set ip tos

set ip precedence

set ip dscp

33

33.1

33.1.1

33.1.2

&

33.2

33.3

Â
Â

33.3.1

Step 1	**configure terminal**	
Step 2	**route-auto-choose cnii gigabitEthernet 0/1 202.100.102.5**	
Step 4	**end**	
Step 5	**show running**	

no route-auto-choose cnii gigabitEthernet 0/1 202.100.102.5

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# route-auto-choose cnii gigabitEthernet 0/1
202.100.102.5
Ruijie(config)#
```

33.3.2

Step 1	**configure terminal**	
Step 2	**route-auto-choose update**	
Step 4	**end**	

```
Ruijie# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# route-auto-choose update
Ruijie(config)#
```

34 RIP

34.1 RIP

120

default-information originate

- **ip default-network**
-

34.2 RIP

-
-
-
-

-
-
-
-
-
-
-
-
-

34.2.1 RIP

router rip	
network	

network-number *wildcard*

wildcard

&
network

---

neighbor *ip-address*	

passive-interface

&

version 1 2	

ip rip send version 1	
ip rip send version 2	
ip rip send version 1 2	

ip rip receive version 1	
ip rip receive version 2	
ip rip receive version 1 2	

34.2.5

ه

ه

no auto-summary	
auto-summary	

ip summary-address rip *ip-address ip-network-mask*	
no ip summary-address rip *ip-address ip-network-mask*	

34.2.6 RIP

ip rip authentication text-password

ip rip authentication mode **text md5**	**text** **md5**
ip rip authentication **text-password** *password-string*	

ip rip authentication key-chain *key-chain-name*	

34.2.7 RIP

timers basic *update invalid flush*	

&

34.2.8 RIP

no validate-update-source	
validate-update-source	

34.2.9 RIP

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

&

no ip rip receive enable	
ip rip receive enable	

no ip rip send enable	
ip rip send enable	

34.2.10 RIP

ip rip default-information originate metric *metric-value*	
no ip rip default-information	

ip rip default-information only metric *metric-value*	
no ip rip default-information	

&

ip rip default-information

default-information originate

34.2.11 RIP VRF

address-family

exit-address-family **exit**

address-family ipv4 vrf *vrf-name*	*vrf-name*

1 RIP

，

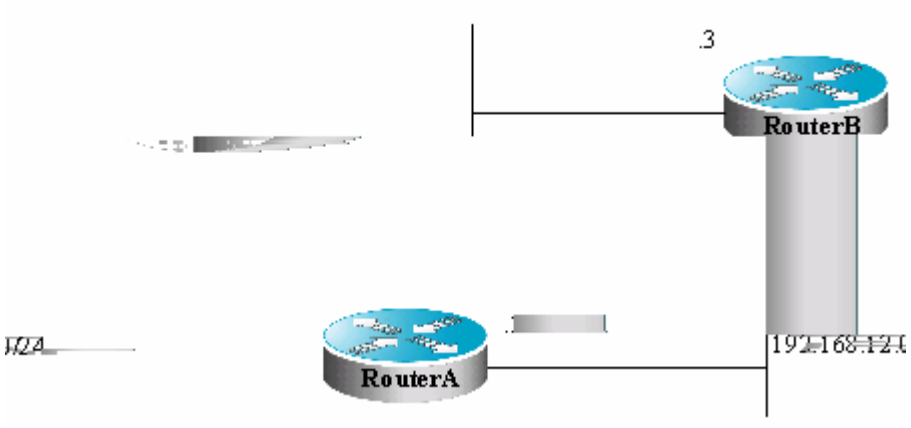
```
interface GigabitEthernet0/0
ip address 192.168.12.1 255.255.255.0

interface Serial1/0
ip address 192.168.123.1 255.255.255.0
encapsulation frame-relay
no ip split-horizon

router rip
version 2
network 192.168.12.0
network 192.168.123.0
```

```
interface GigabitEthernet0/0
ip address 172.16.20.1 255.255.255.0

interface Serial1/0
ip address 192.168.123.2 255.255.255.0
encapsulation frame-relay

router rip
version 2
network 172.16.0.0
network 192.168.123.0
```

```
no auto-summary



interface GigabitEthernet0/0
ip address 172.16.30.1 255.255.255.0


interface Serial1/0
ip address 192.168.123.3 255.255.255.0
encapsulation frame-relay


router rip
version 2
network 172.16.0.0
network 192.168.123.0
no auto-summary



interface GigabitEthernet0/0
ip address 192.168.12.4 255.255.255.0
ip address 192.168.13.4 255.255.255.0 secondary
no ip split-horizon


router rip
version 2
network 192.168.12.0
network 192.168.13.0



interface GigabitEthernet0/0
ip address 192.168.13.5 255.255.255.0


router rip
version 2
network 192.168.13.0
```

34.3.2 RIP

，



2 RIP

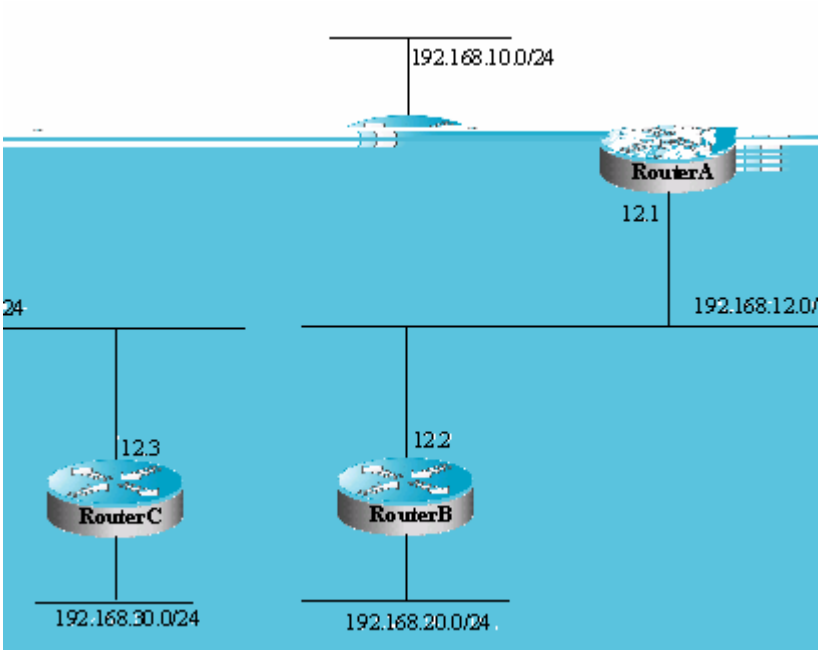
，

```
key chain ripkey
key 1
key-string keya
accept-lifetime 00:00:00 Dec 3 2000 infinite
send-lifetime 00:00:00 Dec 4 2000 infinite
key 2
key-string keyb
accept-lifetime 00:00:00 Dec 3 2000 infinite
send-lifetime 00:00:00 Dec 4 2000 infinite


interface GigabitEthernet0/0
ip address 192.168.12.1 255.255.255.0
ip rip authentication mode md5
ip rip authentication key-chain ripkey
```

```
key chain ripkey
key 1
key-string keyb
accept-lifetime 00:00:00 Dec 3 2000 infinite
send-lifetime 00:00:00 Dec 4 2000 00:00:00 Dec 5 2000
key 2
key-string keya
accept-lifetime 00:00:00 Dec 3 2000 infinite
send-lifetime 00:00:00 Dec 4 2000 infinite


interface GigabitEthernet0/0
ip address 192.168.12.2 255.255.255.0
ip rip authentication mode md5
ip rip authentication key-chain ripkey


router rip
version 2
network 192.168.12.0
```

34.3.3 RIP

，



3 RIP

，

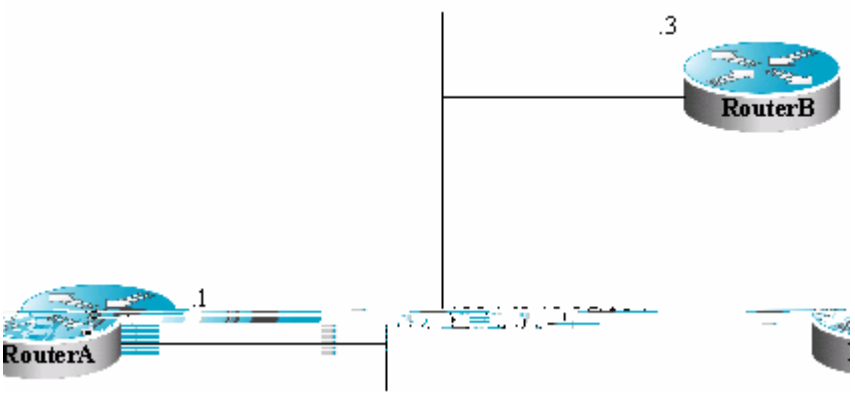
```
interface GigabitEthernet0/0
ip address 192.168.12.1 255.255.255.0

interface Loopback0
ip address 192.168.10.1 255.255.255.0

router rip
version 2
network 192.168.12.0
network 192.168.10.0
passive-interface GigabitEthernet0/0
neighbor 192.168.12.2
```

```
interface GigabitEthernet0/0
ip address 192.168.12.2 255.255.255.0

interface Loopback0
ip address 192.168.20.1 255.255.255.0

router rip
version 2
network 192.168.12.0
network 192.168.20.0
```

```
interface GigabitEthernet0/0
ip address 192.168.12.3 255.255.255.0

interface Loopback0
ip address 192.168.30.1 255.255.255.0

router rip
version 2
network 192.168.12.0
network 192.168.30.0
```

34.3.4 RIP VRF

，



，

```
ip vrf redvpn

interface GigabitEthernet 1/0
ip vrf forwarding redvpn
ip address 192.168.12.1 255.255.255.0

router rip
address-family ipv4 vrf redvpn
network 192.168.12.0
exit-address-family
```

```
interface GigabitEthernet 1/0
ip vrf forwarding bluevpn

router rip
address-family ipv4 vrf bluevpn
network 192.168.12.0
exit-address-family
```

35 OSPF

35.1 OSPF

35.2 OSPF

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

35.2.1 OSPF

configure terminal	
ip routing	
router ospf *process_id* **vrf** *vrf-name*	
network *address wildcard-mask* **area** *area-id*	
end	
show ip protocols	
write	

&

vrf

Networ

network

no router ospf *process-id*

```
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 192.168.0.0 0.0.0.255 area 0
Ruijie(config-router)# end
```

35.2.2 OSPF

configure terminal	
ip routing	
interface	

ip ospf database-filter all out	
end	
show ip ospf *process-id* **interface** *interface-id*	
write	

35.2.3 OSPF

-
-
-

-
-

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

›

›

›

›

ip ospf network point-to-multipoint	
exit	
router ospf *1*	
neighbor ip-address cost *cost*	

&

router ospf *1*

’

’

’

area *area-id* **authentication**	
area *area-id* **authentication message-digest**	
area *area-id* **stub no-summary**	**no-summary:**
area *area-id* **default-cost** *cost*	

&

35.2.5 OSPF NSSA

area *area-id* **range** *ip-address mask* **advertise** **not-advertise** **cost** *cost*	

&

summary-address *ip-address mask* **not-advertise | tag** *tag-id*	

╗

discard-route **internal external**	
no discard-route **internal external**	

35.2.7

# **area** *area-id* **virtual-link** *router-id* **hello-interval** *seconds* **retransmit-interval** *seconds* **transmit-delay** *seconds* **dead-interval** *seconds* **authentication message-digest | null** **authentication-key** *key* **message-digest-key** *keyid* **md5** *key*	

&

show ip ospf

show ip ospf neighbor

35.2.8

¸	
default-information originate always metric *metric-value* **metric-type** *type-value* **route-map** *map-name*	

&

35.2.9 Loopback

interface loopback *1*	
ip address *ip-address mask*	

&

35.2.10 OSPF

distance *distance* **| ospf intra-area** *distance* **| inter-area** *distance* **| external** *distance*	

35.2.11

،	

configure terminal	
router ospf *1*	
timers lsa-group-pacing *seconds*	
end	
show running-config	
write	

no timers lsa-group-pacing

35.2.13 OSPF

≈

write	

no passive-interface *interface-id*

35.2.16 OSPF

¸	
enable mib-binding	

╖

configure terminal	

snmp-server host *host-ip* **version** *version-no string* **ospf**	
snmp-server enable traps ospf	
router ospf *process_id* **vrf** *vrf-name*	
enable traps error ifauthfailure | ifconfigerror | ifrxbadpacket | virtifauthfailure | virtifconfigerror | virtifrxbadpacket lsa lsdbapproachoverflow | lsdboverflow | maxagelsa | originatelsa retransmit iftxretransmit | virtiftxretransmit state-change ifstatechange | nbrstatechange | virtifstatechange | virtnbrstatechange	
end	
write	

35.3 OSPF

show ip ospf *process-id*	
show ip ospf *process-id area-id* **database adv-router** *ip-address* | **asbr-summary external network nssa-external | opaque-area | opaque-as | opaque-link | router summary** *link-state-id* **adv-router** *ip-address* **self-originate} database-summary max-age self-originate**	
show ip ospf *process-id* **border-routers**	
show ip ospf interface *interface-name*	
show ip ospf *process-id* **neighbor** *interface-name neighbor-id* **detail**	
show ip ospf *process-id* **virtual-links** *ip-address*	
show ip ospf *process-id* **route count**	

show ip ospf *process-id* **neighbor**

```
Ruijie # show ip ospf neighbor
OSPF process 1:
Neighbor ID  Pri State    Dead Time    Address   Interface
10.10.10.50 1 Full/DR 00:00:38     10.10.10.50  eth0/0
OSPF process 100:
Neighbor ID  Pri State       Dead Time    Address Interface
10.10.11.50 1 Full/Backup    00:00:31  10.10.11.50  eth0/1
```

```
Ruijie # show ip ospf 1 neighbor
OSPF process 1:
Neighbor ID  Pri State       Dead Time    Address      Interface
10.10.10.50 1 Full/DR    00:00:38     10.10.10.50  eth0
Ruijie # show ip ospf 100 neighbor
OSPF process 100:
Neighbor ID  Pri State       Dead Time    Address      Interface
10.10.11.50 1   Full/Backup  00:00:31     10.10.11.50  eth1
```

```
Ruijie#sh ip ospf interface GigabitEthernet 1/0
GigabitEthernet 1/0 is up, line protocol is up
Internet Address 192.168.1.1/24, Ifindex: 2 Area 0.0.0.0, MTU 1500
Matching network config: 192.168.1.0/24
Process ID 1, Router ID 192.168.1.1, Network Type BROADCAST, Cost:
1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.1.1, Interface Address 192.168.1.1
Backup Designated Router (ID) 192.168.1.2, Interface Address
192.168.1.2
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit
5
Hello due in 00:00:04
Neighbor Count is 1, Adjacent neighbor count is 1
Crypt Sequence Number is 30
Hello received 972 sent 990, DD received 3 sent 4
LS-Req received 1 sent 1, LS-Upd received 10 sent 26
LS-Ack received 25 sent 7, Discarded 0
```

```
Ruijie# show ip ospf
Routing Process "ospf 1" with ID 1.1.1.1
Process uptime is 4 minutes
Process bound to VRF default
Conforms to RFC2328, and RFC1583Compatibility flag is enabled
Supports only single TOS(TOS0) routes
Supports opaque LSA
```

```
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 incomming 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 Adjency 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

Routing Process "ospf 20" with ID 2.2.2.2
Process uptime is 4 minutes
Process bound to VRF default
Conforms to RFC2328, and RFC1583Compatibility flag is enabled
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
LsaGroupPacing: 240 secs
Number of incomming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum 0x000000
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 0
```

د

```
encapsulation frame-relay
ip ospf network non-broadcast


router ospf 1
network 192.168.123.0 0.0.0.255 area 0
neighbor 192.168.123.1 10
neighbor 192.168.123.2 5
timers spf 500 1000 10000
```

35.4.2 OSPF

،

```
interface GigabitEthernet 0/0
ip address 192.168.12.1 255.255.255.0


interface Serial 1/0
ip address 192.168.123.1 255.255.255.0
encapsulation frame-relay
ip ospf network point-to-multipoint


router ospf 1
network 192.168.23.0 0.0.0.255 area 0
network 192.168.123.0 0.0.0.255 area 0




interface GigabitEthernet 0/0
ip address 192.168.23.2 255.255.255.0


interface Serial 1/0
ip address 192.168.123.2 255.255.255.0
encapsulation frame-relay
ip ospf network point-to-multipoint


router ospf 1
network 192.168.23.0 0.0.0.255 area 0
network 192.168.123.0 0.0.0.255 area 0




interface GigabitEthernet 0/0
ip address 192.168.23.3 255.255.255.0


interface Serial 1/0
ip address 192.168.123.3 255.255.255.0
```

```
interface GigabitEthernet0/0
ip address 192.168.12.1 255.255.255.0
ip ospf message-digest-key 1 md5 hello


router ospf 1
network 192.168.12.0 0.0.0.255 area 0
area 0 authentication message-digest
```

```
interface GigabitEthernet0/0
ip address 192.168.12.2 255.255.255.0
ip ospf message-digest-key 1 md5 hello


router ospf 1
network 192.168.12.0 0.0.0.255 area 0
area 0 authentication message-digest
```

35.4.4 OSPF

，

د

ز OSPF ^

```
interface GigabitEthernet0/0
ip address 192.168.12.2 255.255.255.0


interface Serial 1/0
ip address 192.168.23.2 255.255.255.0


router ospf 1
network 192.168.12.0 0.0.0.255 area 0
network 192.168.23.0 0.0.0.255 area 0



interface GigabitEthernet 0/0
ip address 192.168.34.3 255.255.255.0


interface Serial 1/0
ip address 192.168.23.3 255.255.255.0


router orea 0
network 192.168.23.0 0.0.0.2r ospf 1
nessrk 192.168.23.0 0.5.255.255 Tc89
                                        A' Û C


                                        interface GigabitEthernet 0/0
                                        ip addre4s 192.168.23.2 255.255.255.0


            interface Gi(nter[(r)6(oute)6eri)6(al 1/)6(0)6( )]TJ0 Tw T*7216
```

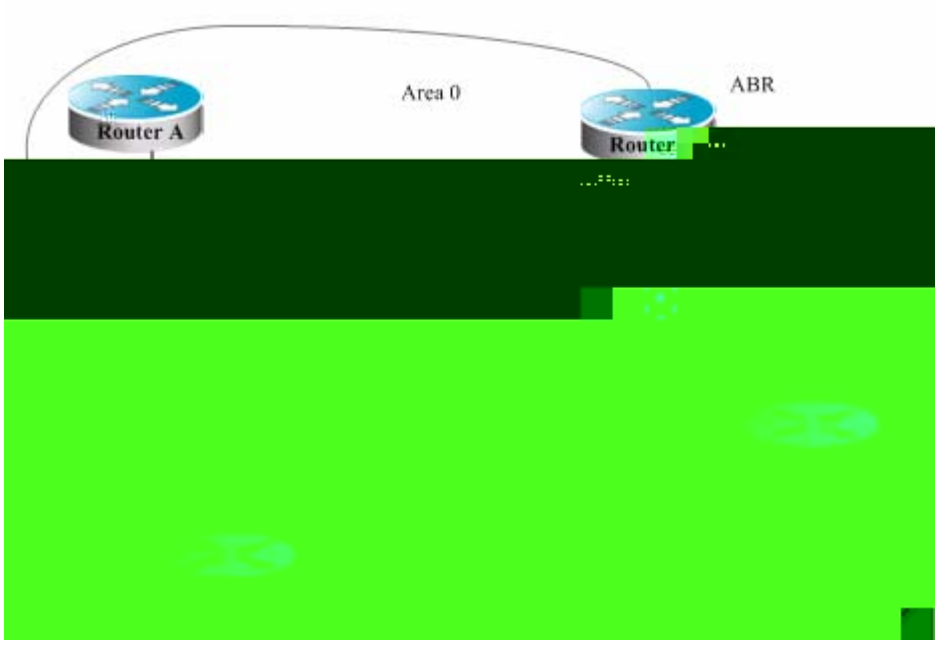
```
router ospf 1
network 192.168.34.0 0.0.0.255 area 34
redistribute rip metric-type 1 subnets tag 34


router rip
network 200.200.1.0
network 172.200.0.0
```

“ ”

```
O E1 200.200.1.0/24 [110/85] via 192.168.23.3, 00:00:33, Serial1/0
O IA 192.168.34.0/24 [110/65] via 192.168.23.3, 00:00:33, Serial1/0
O E1   172.200.1.0 [110/85] via 192.168.23.3, 00:00:33, Serial1/0
```

35.4.6 OSPF

,



9OSPF

```
router ospf 1
network 192.168.23.0 0.0.0.255 area 0
network 192.168.34.0 0.0.0.255 area 34
network 192.168.30.0 0.0.0.255 area 34
area 34 stub no-summary
```

```
interface GigabitEthernet0/0
ip address 192.168.34.4 255.255.255.0
```

```
router ospf 1
network 192.168.34.0 0.0.0.255 area 34
area 34 stub
```

```
O 192.168.30.0/24 [110/1786] via 192.168.34.3, 00:00:03,
GigabitEthernet0/0
O*IA 0.0.0.0/0 [110/2] via 192.168.34.3, 00:00:03,
GigabitEthernet0/0
```

35.4.7 OSPF

،

،

```
interface GigabitEthernet0/0
ip address 192.168.12.1 255.255.255.0

router ospf 1
network 192.168.12.0 0.0.0.255 area 0
```

```
interface GigabitEthernet0/0
ip address 192.168.12.2 255.255.255.0

interface Serial1/0
ip address 192.168.23.2 255.255.255.0
```

```
interface Loopback2
ip address 2.2.2.2 255.255.255.0


router ospf 1
network 192.168.12.0 0.0.0.255 area 0
network 192.168.23.0 0.0.0.255 area 23
area 23 virtual-link 3.3.3.3



interface GigabitEthernet0/0
ip address 192.168.34.3 255.255.255.0


interface Serial1/0
ip address 192.168.23.3 255.255.255.0


interface Loopback2
ip address 3.3.3.3 255.255.255.0


router ospf 1
network 192.168.23.0 0.0.0.255 area 23
network 192.168.34.0 0.0.0.255 area 34
area 23 virtual-link 2.2.2.2



interface GigabitEthernet0/0
ip address 192.168.34.4 255.255.255.0


router ospf 1
network 192.168.34.0 0.0.0.255 area 34


O IA 192.168.12.0/24 [110/66] via 192.168.34.3, 00:00:10,
GigabitEthernet0/0
```

```
O IA 192.168.23.0/24 [110/65] via 192.168.34.3, 00:00:25,
GigabitEthernet0/0
```

36

36.1 IP

36.1.1

ip route vrf *vrf_name network*
mask ip-address

&

“ ”

show ip route weight

```
Ruijie(config)#ip route 10.0.0.0 255.0.0.0 172.0.1.2 weight 6
Ruijie(config)#ip route 10.0.0.0 255.0.0.0 172.0.1.4 weight 6
Ruijie(config)#show ip route 10.0.0.0

Routing entry for 10.0.0.0/8
  Distance 1, metric 0
  Routing Descriptor Blocks:
  *172.0.1.2, generated by "static"
Ruijie(config)#show ip route weight

------------[distance/metric/weight]-----------
S    10.0.0.0/8 [1/0/6] via 172.0.1.2
```

show ip route

36.1.2

“

”

“ ”

“ ”

ip default-network	
no ip default-network	

&

default-network

show ip route “ ”

“

”

36.1.3

maximum-paths *number*	

36.2

route-map

route-map *route-map-name* **permit deny** *sequence*	*sequence*
no route-map *route-map-name* **permit deny** *sequence*	

match **set**

match **set**

match community *standard-list-number expanded-list-number community-list-name*	
match interface *interface-type interface-number*	
match ip address *Access-list-number …access-list-number*	
match ip next-hop *access-list-number …access-list-number*	
match ip route-source *access-list-number …access-list-number*	

match ipv6 address *access-list-name* **prefix-list** *prefix-list-name*	
match ipv6 next-hop *access-list-name* **prefix-list** *prefix-list-name*	
match ipv6 route-source *access-list-name* **prefix-list** *prefix-list-name*	
match metric *Metric*	*Metric*
match origin egp igp incomplete	
match route-type local internal external level-1 level-2	
match tag *tag*	*tag*

set aggregator as *as-num ip_addr*	
set as-path prepend *as-number*	
set comm-list *community-list-number community-list-name* **delete**	
set community *community-number community-number …* **additive none**	
set dampening *half-life reuse suppress max-suppress-time*	

set extcommunity rt *extend-community-value* **soo** *extend-community-value*	
set interface *interface-type interface-number*	
set ip default next-hop *ip-address*	
set ip next-hop *ip-address*	
set ip next-hop verify-availability *ip-address* **track** *track-object-num*	
set level stub-area backbone level-1 level-1-2 level-2	
set local-preference *number*	
set metric *metric*	
set metric *metric-value* **-** *metric-value metric-value*	
set metric-type type-1 type-2 | external internal	
set next-hop *next-hop*	*next-hop*
set origin egp igp incomplete	
set originator-id *ip-addr*	
set tag *tag*	
set weight *number*	

match set

match set

36.3.2

	always( )
default-information originate always metric *metric* **metric-type** *type* **route-map** *map-name*	**metric(**

distribute-list
access-list-number | *access-list-name* **prefix**
prefix *prefix-list-name* **out**
interface-type interface-number

36.4

36.4.1

```
Ruijie(config)# router ospf 1
Ruijie(config-router)# redistribute rip subnets route-map redrip
Ruijie(config-router)# network 192.168.12.0 0.0.0.255 area 0

Ruijie(config)# access-list 20 permit 200.168.23.0

Ruijie(config)# route-map redrip permit 10
Ruijie(config-route-map)# match metric 4
Ruijie(config-route-map)# set metric 40
Ruijie(config-route-map)# set metric-type type-1
Ruijie(config-route-map)# set tag 40
```

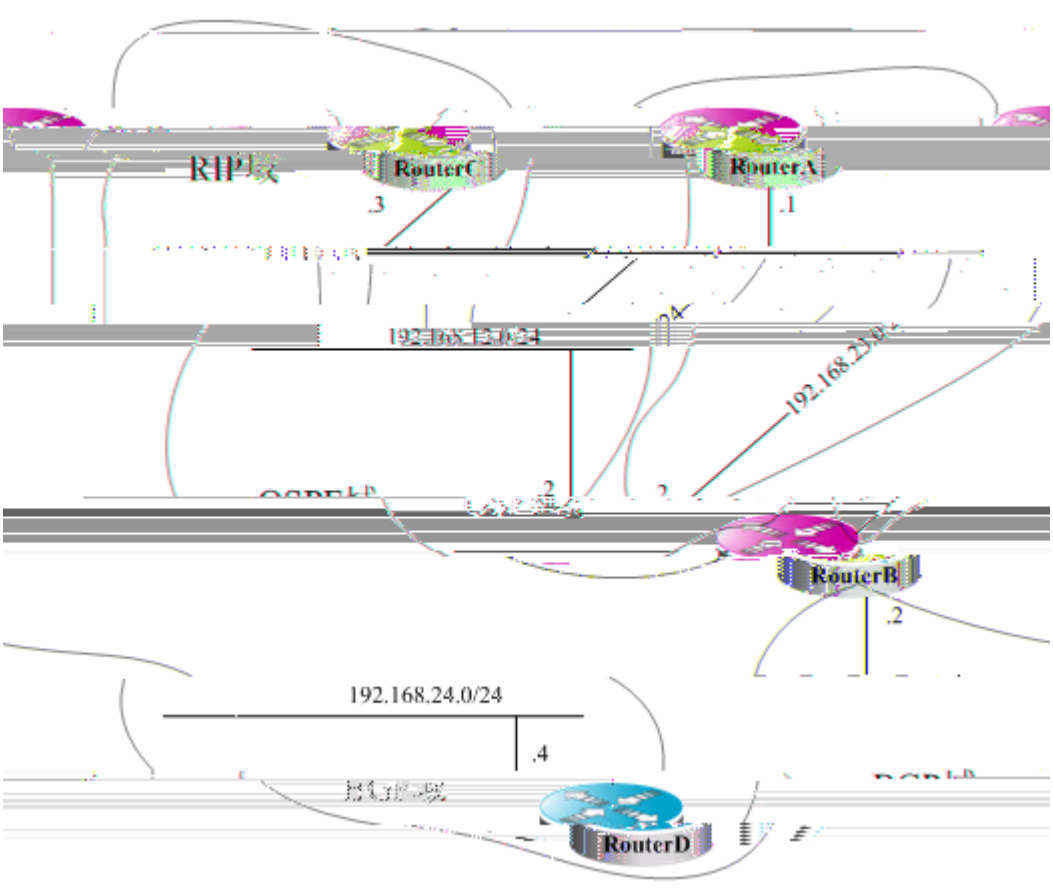
```
Ruijie(config)# router rip
Ruijie(config-router)# version 2
Ruijie(config-router)# redistribute ospf 1 route-map redospf
Ruijie(config-router)# network 200.168.23.0

Ruijie(config)# route-map redospf permit 10
Ruijie(config-route-map)# match tag 10
Ruijie(config-route-map)# set metric 10
```

```
Ruijie(config)# route-map redrip permit 10
Ruijie(config-route-map)# match length 1 3
Ruijie(config-route-map)# match route-type external
Ruijie(config-route-map)# set level backbone
```

```
Ruijie(config)# ip access-list extended EXT_ACL
Ruijie(config-ext-nacl)#10 permit ip 192.168.1.0 0.0.0.255
any
Ruijie(config-ext-nacl)#10 permit ip 172.16.1.0 0.0.0.255 any
```

36.4.3

，



1

```
Ruijie(config)# interface gigabitEthernet 0/0
Ruijie(config-if)# ip address 192.168.10.1 255.255.255.0
Ruijie(config)# interface loopback 1
Ruijie(config-if)# ip address 192.168.100.1 255.255.255.0
Ruijie(config-if)# no ip directed-broadcast
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# ip address 192.168.12.55 255.255.255.0
```

OSPF

```
Ruijie(config)# router ospf 12
Ruijie(config-router)# network 192.168.10.0 0.0.0.255 area 0
Ruijie(config-router)# network 192.168.12.0 0.0.0.255 area 0
Ruijie(config-router)# network 192.168.100.0 0.0.0.255 area 0
```

```
Ruijie(config)# interface gigabitEthernet 0/0
Ruijie(config-if)# ip address 192.168.12.5 255.255.255.0
Ruijie(config)# interface Serial 1/0
Ruijie(config-if)# ip address 192.168.23.2 255.255.255.0
```

```
Ruijie(config)# router ospf 12
Ruijie(config-router)# redistribute rip metric 100 metric-type 1
subnets
Ruijie(config-router)# redistribute bgp route-map ospfrm
subnets
Ruijie(config-router)# network 192.168.12.0 0.0.0.255 area 0
```

```
Ruijie(config)# router rip
Ruijie(config-router)# redistribute ospf 12 metric 2
Ruijie(config-router)# network 192.168.23.0
Ruijie(config-router)# distribute-list 10 out ospf
Ruijie(config-router)# default-information originate always
Ruijie(config-router)# no auto-summary
```

```
Ruijie(config)# router bgp 2
Ruijie(config-router)# neighbor 192.168.24.4 remote-as 4
Ruijie(config-router)# address-family ipv4
Ruijie(config-router-af)# neighbor 192.168.24.4 activate
Ruijie(config-router-af)# neighbor 192.168.24.4
 send-community


Ruijie(config)# route-map ospfrm
Ruijie(config-route-map)# match community cl_110


Ruijie(config)# access-list 10 permit 192.168.10.0

      community
Ruijie(config)# ip community-list standard cl_110 permit 11:11



Ruijie(config)# interface gigabitEthernet 0/0
Ruijie(config-if)# ip address 192.168.30.1 255.255.255.0
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# ip address 192.168.3.1 255.255.255.0
Ruijie(config)# interface Serial 1/0
Ruijie(config-if)# ip address 192.168.23.3 255.255.255.0

      RIP
Ruijie(config)# router rip
Ruijie(config-router)# network 192.168.23.0
Ruijie(config-router)# network 192.168.3.0
Ruijie(config-router)# network 192.168.30.0



Ruijie(config)# interface gigabitEthernet 0/0
Ruijie(config-if)# ip address 192.168.40.1 255.255.255.0
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# ip address 192.168.4.1 255.255.255.0
Ruijie(config)# interface gigabitEthernet 1/0
Ruijie(config-if)# ip address 192.168.24.4 255.255.255.0

      BGP
Ruijie(config)# router bgp 4
Ruijie(config-router)# neighbor 192.168.24.2 remote-as 2
```

```
Ruijie(config-router)# redistribute connected route-map bgprm
Ruijie(config-router)# address-family ipv4
Ruijie(config-router-af)# neighbor 192.168.24.2 activate
Ruijie(config-router-af)# neighbor 192.168.24.2
 send-community


Ruijie(config)# route-map bgprm
Ruijie(config-route-map)# set community 22:22


O   E1   192.168.30.0/24   [110/101]   via   192.168.12.5,   00:04:07,
GigabitEthernet0/1
O   E1   192.168.3.0/24   [110/101]   via   192.168.12.5,   00:04:07,
GigabitEthernet0/1


R    0.0.0.0/0 [120/1] via 200.168.23.2, 00:00:00, Serial1/0
R    192.168.10.0/24 [120/2] via 200.168.23.2, 00:00:00,
Serial1/0
```

37

37.1

-
-
-
-
-
-

37.1.1

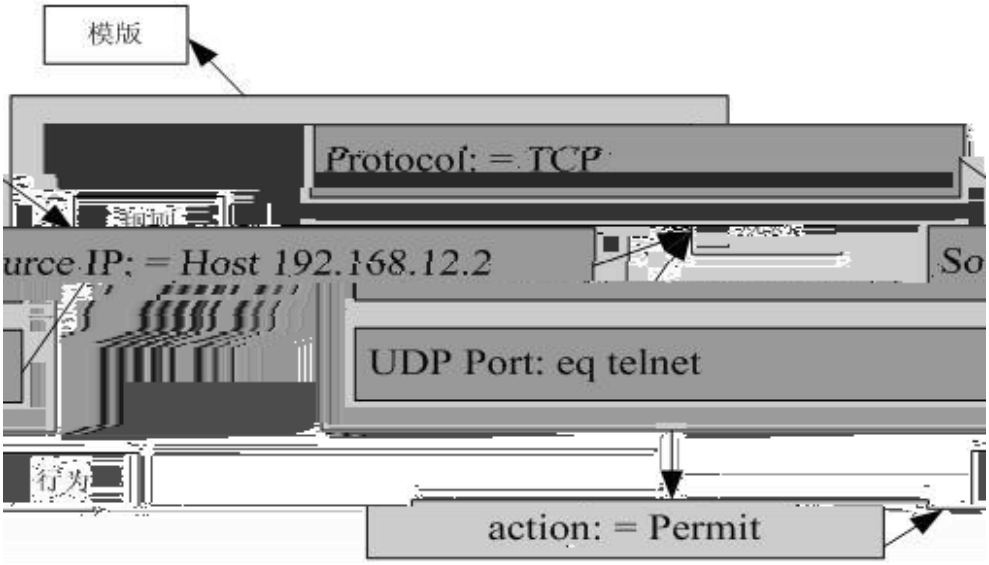
37.1.2

ɔ

ɔ

1 1 Ä b’

37.1.4 / ACL



2 ACE permit tcp host 192.168.12.2 any eq telnet

&

37.2 IP

L

د

access list deny ip any any

access list permit tcp eq telnet any

37.2.2 IP

access-list *id* **deny permit** *src-wildcard* **host** *src* **any time-range** *tm-rng-name*	
interface *interface*	
ip access-group *id* **in out unreflect**	

ip access-list standard extended *id name*	

sn **permit** **deny** *src-wildcard* **host** *src* **any** **time-range** *tm-rng-name*	
exit **interface** *interface*	
ip access-group *id* **in** **out** **reflect** **unreflect**	

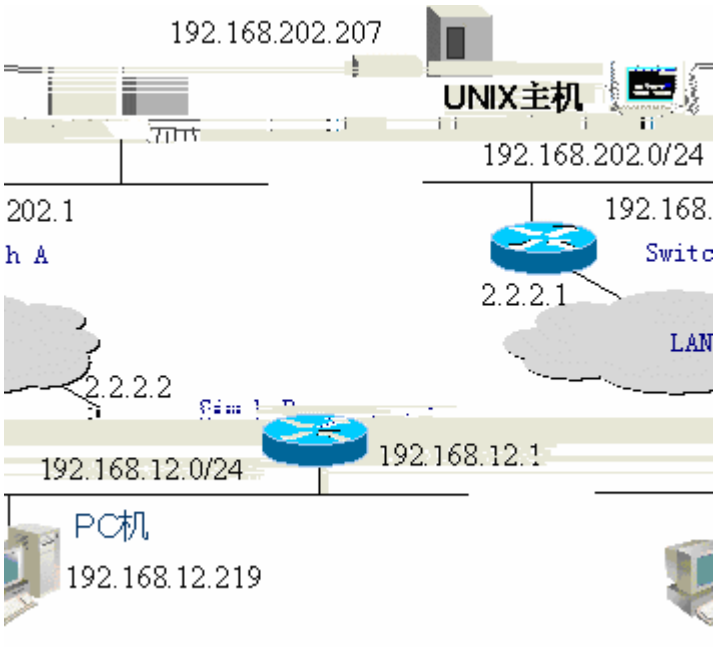
&

37.2.3 IP

show access-lists *id* *name*

37.2.4 IP

,



3

&

、

```
Ruijie(config)# interface GigabitEthernet 0/1
Ruijie(config-if)# ip address 192.168.12.1 255.255.255.0
Ruijie(config-if)# exit
Ruijie(config)# interface GigabitEthernet 0/2
Ruijie(config-if)# ip address 2.2.2.2 255.255.255.0
Ruijie(config-if)# ip access-group 101 in
Ruijie(config-if)# ip access-group 101 out
```

101

```
Ruijie(config)# access-list 101 permit tcp 192.168.12.0 0.0.0.255 any
eq telnet time-range check
```

```
Ruijie(config)# access-list 101 deny icmp 192.168.12.0 0.0.0.255 any
Ruijie(config)# access-list 101 deny ip 2.2.2.0 0.0.0.255 any
Ruijie(config)# access-list 101 deny ip any any


Ruijie(config)# time-range check
Ruijie(config-time-range)# periodic weekdays 8:30 to 17:30
```

&

```
Ruijie(config)# hostname Ruijie
Ruijie(config)# interface GigabitEthernet 0/1
Ruijie(config-if)# ip address 192.168.202.1 255.255.255.0
Ruijie(config)# interface GigabitEthernet 0/2
Ruijie(config-if)# ip address 2.2.2.1 255.255.255.0
```

37.3 Expert

37.3.1 Expert

,

37.3.2 Expert

access-list *id* **deny** **permit** *prot* *ethernet-type* **cos** *cos* **VID** *vid* *src-wildcard* **host** *src* **host** *src-mac-addr* **any** *dst-wildcard* **host** *dst* **any** **host** *dst-mac-addr* **any** **precedence** *precedence* **tos** *tos* **dscp** *dscp* **fragment** **time-range** *tm-rng-name*	
interface *interface*	
expert access-group *id* **in** **out** **unreflect**	

expert access-list **extended** *id name*	

sn **permit**

deny *prot* *ethernet-type* **cos** *cos*
VID
vid *src-wildcard* **host** *src* **host**
src-mac-addr **any**
dst-wildcard **host** *dst* **any** **host**
dst-mac-addr **any** **precedence**
precedence **tos** *tos* **dscp**

```
Ruijie(config-exp-nacl)# exit
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# expert access-group expert-list in
Ruijie(config-if)# end
Ruijie# show access-lists
expert access-list extended expert-list
petmit ip vid 20 any host 0013.2049.8272 any any
deny any any
Ruijie#
```

37.4 TCP Flag

permit tcp any any match-all rst

-
-
-
-

ip access-list resequence *acl-id*| *acl-name* *sn-start sn-inc*

```
ace4: 109
```

```
Ruijie(config)# time-range no-http
Ruijie(config-time-range)# periodic weekdays 8:00 to 18:00
Ruijie(config)# end
Ruijie(config)# ip access-list extended limit-udp
Ruijie(config-ext-nacl)# deny tcp any any eq www time-range no-http
Ruijie(config-ext-nacl)# exit
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# ip access-group no-http in
Ruijie(config)# end

Ruijie# show time-range
```

```
Ruijie# show access-lists 101

ip access-list extended 101
10 deny tcp any any match-all syn
20 permit ip any any
```

38 RPL

38.1 RPL

38.1.1 RPL

38.1.2 RPL

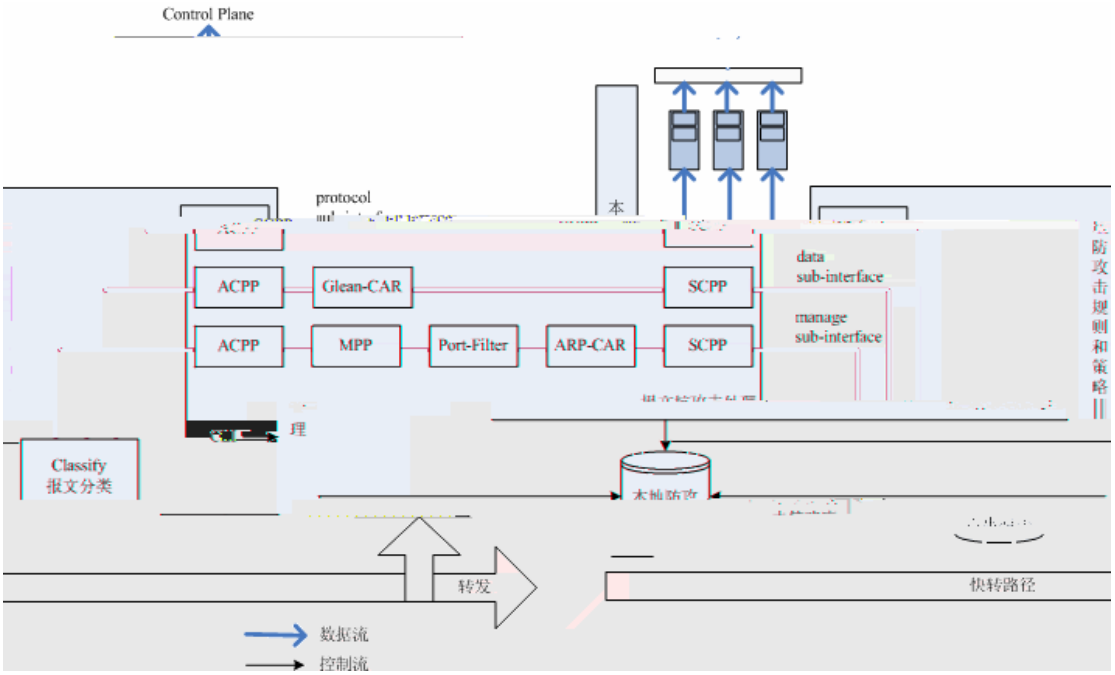
reverse-path	
no reverse-path	

38.1.3 RPL

reverse-path

39

39.1



Classify

protocol sub-interface

manage sub-interface

data sub-interface

&	

SCPP

Glean-CAR

Â

Â

Â

Â

Â

Â

&

39.2.2 control-plane

control-plane protocol manage data	

39.2.3 SCPP

scpp list *acl_no* **bw-rate bw-burst-rate** *bw burst rate* **conn-total** *conn num* **conn-create-rate** *o create rate* **conn-create-burst-rate** *conn create burst rate*	

no scpp list	

39.2.4 Glean-CAR

glean-car *packet_rate_per_group*	*packet_rate_per_group*
no glean-car	

39.2.5 ARP-CAR

arp-car *packet_rate_per_group*	*packet_rate_per_group*
no arp-car	

acpp bw-rate *rate* **bw-burst-rate** *burst-rate*	*rate* *burst-rate*
no acpp	

39.2.9

? - / ی بج

```
Ruijie(config-cp)# port-filter

Ruijie(config-cp)# management-interface gi0/0 allow telnet snmp
```

40

40.1 ip-mac

40.1.1 ip-mac

40.1.2 ip-mac

ㄲ

ipmacbind

ipmacbind

```
Ruijie(config)# ipmacbind 192.168.52.69 032a.33ac.3f11 log
```

ipmacbind auto

```
Ruijie(config)# ipmacbind auto
```

no

clear ipmacbind

```
Ruijie# clear ipmacbind dynamic
```

ipmacbind auto

```
Ruijie# clear ipmacbind all
```

```
Ruijie(config)#
```

show ipmacbind

```
Ruijie# show ipmacbind table
Totol number of IPMAC-Bind: 5
No      Type        IP Address       MAC Address        Log
1     <static>     192.168.52.69    032a.33ac.3f11    on
2     <auto>       192.168.52.1      00d0.f8b8.c898    on
3     <auto>       138.138.138.138    00d0.f822.33aa    on

Ruijie# show ipmacbind statistic
IPMAC-Bind dropped 1527 packets

Ruijie# show ipmacbind hash
```

40.2

40.2.1

40.2.2

ip ingress-filter

```
Ruijie(config-if)# ip ingress-filter log
```

```
Ruijie(config-if)# no ip ingress-filter log
```

show ip ingress-filter

```
Ruijie(config)# show ip ingress-filter
Firewall Network-ingress-filter is enable, blocked 0 flowsInterface
GigabitEthernet 1/0: log is on, blocked 0 flows
```

40.3 TCP SYN

40.3.1 TCP SYN

40.3.2 TCP SYN

Ruijie(config)# **access-list** *100* **permit ip** *192.168.52.0 0.0.0.255* **any**

40.4.2

```
Ruijie(config)# ip inspect name abc ftp
Ruijie(config)# ip inspect name abc mms
Ruijie(config)# ip inspect name 123 mms
Ruijie(config)# ip inspect name 123 h323

Ruijie(config)# show ip inspect all
Inspection Rule Configuration
Inspection name abc
ftp
mms
Inspection name 123
mms
h323


Ruijie(config)# interface gigabitEthernet 0/0
Ruijie(config-if)# ip inspect abc in
Ruijie(config)# show ip inspect all
Inspection Rule Configuration
Inspection name abc
ftp
mms
Inspection name 123
mms
h323

Interface Configurationn
Interface gigabitEthernet 0/0
Inbound inspection rule is abc
ftp
```

```
mms



Ruijie(config)# interface gigabitEthernet 0/0
Ruijie(config-if)# ip inspect abc in
Ruijie(config)# show ip inspect all
Inspection Rule Configuration
Inspection name abc
ftp
mms
Inspection name 123
mms
h323

Interface Configurationn
Interface gigabitEthernet 0/0
Inbound inspection rule is abc
ftp
mms

Ruijie(config)# interface gigabitEthernet 0/0
Ruijie(config-if)# ip inspect 123 in
Ruijie(config)# show ip inspect all
Inspection Rule Configuration
Inspection name abc
ftp
mms
Inspection name 123
mms
h323

Interface Configurationn
Interface gigabitEthernet 0/0
Inbound inspection rule is 123
mms
h323
```

40.5 TCP

40.5.1 TCP

40.5.2 TCP

Ⅶ

```
Ruijie(config)# in gi 0/0
Ruijie(config-if)# session-limit access-group 1 rate 100 concurrent
100000 in log
```

40.6.3

```
Ruijie(config-if)# show session-limit config

             Show gigabitEthernet 0/0's config
Input
session-limit access-group 1 rate 12 concurrent 123 in log
session-limit access-group 12 rate 20 concurrent 100 in log
session-limit access-group 13 rate 20 concurrent 100 in log
session-limit access-group 14 rate 20 concurrent 100 in log

 Output
session-limit access-group 1 rate 12 concurrent 123 out log
            Show gigabitEthernet 0/0's config end]
```

```
Ruijie(config-if)# show session-limit del-rule

       Show Cmd to del the rule on the gigabitEthernet 0/0
Input
no session-limit access-group 1 rate 12 concurrent 123
in log
no session-limit access-group 12 rate 20 concurrent 100
in log
no session-limit access-group 13 rate 20 concurrent 100
in log
no session-limit access-group 14 rate 20 concurrent 100
in log
```

```
Output
no session-limit access-group 1 rate 12 concurrent 123
out log
   Show Cmd to del the rule on the gigabitEthernet 0/0's end



Ruijie(config-if)# show session-limit statistics

          Show gigabitEthernet 0/0's Statistics
Input
matches access-group  : 1
[Configure]:  new_session_rate : 12 , concurren : 123
[Statistics]:  conformed 2247 sessions, blocked 0 sessions

matches access-group  : 12
[Configure]:  new_session_rate : 20 , concurren : 100
[Statistics]:  conformed 0 sessions, blocked 0 sessions

matches access-group  : 13
[Configure]:  new_session_rate : 20 , concurren : 100
[Statistics]:  conformed 0 sessions, blocked 0 sessions

matches access-group  : 14
[Configure]:  new_session_rate : 20 , concurren : 100
[Statistics]:  conformed 0 sessions, blocked 0 sessions


Output
matches access-group  : 1
[Configure]:  new_session_rate : 12 , concurren : 123
[Statistics]:  conformed 0 sessions, blocked 0 sessions

          Show gigabitEthernet 0/0's Statistics End
```

40.7

40.7.1

40.7.2

ip rate-control

ip session track-state-strictly

&

ip session track-state-strictly

---

41 VPDN

41.1 VPDN

-

-

42 PPTP

42.1 PPTP

42.2 PPTP

42.2.1

-
-
-
-
-

42.2.2

(e)-1r

name

accept-dialin	
no accept-dialin	

protocol any l2tp

pptp

terminate-from hostname *name*	
no terminate-from hostname	

name

local name *name*	
no local *name*	

name

source-ip *src-ip*	
no source-ip	

src-ip

```
Description . . . . . . . . . . . : STAR 901 Family Fast Ethernet
r (ACPI)
Physical Address. . . . . . . . . : 00-D0-F8-00-68-E5
DHCP Enabled. . . . . . . . . . . : No
IP Address. . . . . . . . . . . . : 192.168.201.144
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : 192.168.201.123
DNS Servers . . . . . . . . . . . : 202.101.143.141
Primary WINS Server . . . . . . . : 192.168.9.7
F:\>route print
===========================================================
Interface List
0x1 ........................... MS TCP Loopback interface
0x2 ...00 d0 f8 00 68 e5 ...... PCI Bus Master Adapter
===========================================================Active
Routes:
Network Destination  Netmask   Gateway      Interface  Metric
0.0.0.0    0.0.0.0  192.168.201.123  192.168.201.144     1
127.0.0.0  255.0.0.0       127.0.0.1      127.0.0.1      1
192.168.201.0  255.255.255.0  192.168.201.144 192.168.201.144
1
192.168.201.144  255.255.255.255 127.0.0.1   127.0.0.1    1
192.168.201.255  255.255.255.255  192.168.201.144  192.168.201.144
1
224.0.0.0  224.0.0.0  192.168.201.144  192.168.201.144  1
255.255.255.255  255.255.255.255  192.168.201.144  192.168.201.144
1
Default Gateway:   192.168.201.123
===========================================================
Persistent Routes:
None



F:\>ipconfig /all
Windows 2000 IP Configuration
Host Name . . . . . . . . . . . . : testpc
```

```
192.168.201.123  255.255.255.255  192.168.201.144  192.168.201.144
1
192.168.201.144  255.255.255.255       127.0.0.1      127.0.0.1
1
192.168.201.200  255.255.255.255  192.168.201.100  192.168.201.144
1
192.168.201.255  255.255.255.255  192.168.201.144  192.168.201.144
1
224.0.0.0     224.0.0.0       1.1.1.4        1.1.1.4    1
224.0.0.0  224.0.0.0  192.168.201.144  192.168.201.144  1
255.255.255.255  255.255.255.255  192.168.201.144  192.168.201.144
1
Default Gateway:          192.168.12.1
===========================================================
Persistent Routes:
None
F:\>
F:\>ping 192.168.12.1
Pinging 192.168.12.1 with 32 bytes of data:
Reply from 192.168.12.1: bytes=32 time<10ms TTL=255
Reply from 192.168.12.1: bytes=32 time<10ms TTL=255
Reply from 192.168.12.1: bytes=32 time<10ms TTL=255
Reply from 192.168.12.1: bytes=32 time<10ms TTL=255
Ping statistics for 192.168.12.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  0ms, Average =  0ms
F:\>ping 192.168.12.79
Pinging 192.168.12.79 with 32 bytes of data:
Reply from 192.168.12.79: bytes=32 time=10ms TTL=127
Reply from 192.168.12.79: bytes=32 time<10ms TTL=127
Reply from 192.168.12.79: bytes=32 time<10ms TTL=127
Reply from 192.168.12.79: bytes=32 time<10ms TTL=127
Ping statistics for 192.168.12.79:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  10ms, Average =  2ms


R3660#sh ip route
Codes: C - connected, S - static,  R - RIP
O - OSPF, IA - OSPF inter area
```

```
E1 - OSPF external type 1, E2 - OSPF external type 2
Gateway of last resort is 0.0.0.0 to network 0.0.0.0
1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      1.1.1.0/24 is directly connected, Virtual-Access1
C      1.1.1.4/32 is directly connected, Virtual-Access1
C   192.168.12.0/24 is directly connected, GigabitEthernet0/1
C   192.168.201.0/24 is directly connected, GigabitEthernet0/0
S*  0.0.0.0/0 is directly connected, GigabitEthernet0/0
R3660#
```

42.2.8 PPTP

show vpdn

show vpdn tunnel	
show vpdn session	
show vpdn	

```
R3660# sh vpdn
%No active L2TP tunnels
PPTP Tunnel and Session Information Total tunnels 1 sessions 1
LocID Remote Name    State      Remote Address  Port  Sessions
1                    estbed     192.168.201.144 1436  1
LocID RemID TunID  Intf   Username     State     Last Chg
1     49152 1      Vi1    pc           connected  00:31:33
R3660#
```

clear vpdn

clear vpdn tunnel

l2tp **pptp** *clnnnjppt*

```
VPDN: Pptp tunnel id 0 recv outgoing-call-request!
Pptp: Tunnel to 192.168.200.114 get config para. from vpdn-group pptp!
VPDN: Must process using ACCEPT_DIALIN parameters
Pptp: Session va0 get config para. from vpdn-group pptp!
VPDN: Pptp session va0 state change: idle --> connected
PPTP: Receive outcall request,process ok!assign local call id = 1
VPDN: Pptp tunnel id 0 send out-call reply
%LINK CHANGED: Interface virtual-access 0, changed state to up
VPDN: Pptp tunnel to 192.168.200.114 peer callid 1 recv set-linkinfo
VPDN: Pptp tunnel to 192.168.200.114 peer callid 1 recv set-linkinfo
%LINE PROTOCOL CHANGE: Interface virtual-access 0, changed state to
UP
```

debug vpdn packet

```
PPTP: I Start-Control-Connection-Request len 156 Magic Cookie
0x1A2B3C4D
Protocol Version 0x100
Framing Type 0x1
Bearer Type 0x1
Maximum Channels 0x0
```

```
Phone Number:
Subaddress:

PPTP: O Outgoing-Call-Reply len 32 Magic Cookie 0x1A2B3C4D
Call Id 0x1
Peer Call Id 0x4000
Result Code 0x1
Error Code 0x0
Cause Code 0x0
Connect Speed 0xFA00
Rec Window Size 0x10
Physical Channel Id 0x0

PPTP: I Set-Link-Info len 24 Magic Cookie 0x1A2B3C4D
Peer Call Id 0x1
Send ACCM 0xFFFFFFFF
Recv ACCM 0xFFFFFFFF
%UPDOWN: Interface Virtual-Access1, changed state to up
```

```
VPDN: PPTP session Virtual-Access1 wait pak ack timeout(wait seq=39,
ack=36), de
crease send window to half of current = 8!
VPDN: PPTP session Virtual-Access1 adjust ATO to 400 ms!
VPDN: Pptp EGRE encap fail, err=-4!
VPDN: PPTP session Virtual-Access1 wait pak ack timeout(wait seq=40,
ack=36), de
crease send window to half of current = 4!
```

43 L2TP

43.1 L2TP

ک‘

د

د

د

د

timeout setup *seconds*	
no timeout setup	

size *initial-retries*
initial-timeout
retries *timeou*

seconds

authentication	
no authentication	
no hostname	
hostname *host-name*	
password *pass-words*	
no password	

host-name
pass-words

hello *interval*

43.2.3 pseudowire-class

›

›

›

›

Pseudowire-class

pseudowire-class *pseudowire- class-name*	
no pseudowire-class *pseudowire- class-name*	

pseudowire-class-name **Pseudowire-class**
Pseudowire-class **Interface Vrtual-ppp**

encapsulation l2tpv2	

ip dfbit set	
no ip dfbit set	
ip ttl *ttl-value*	
no ip ttl	
ip local interface *interface-name*	
no ip local interface *interface-name*	

protocol l2tpv2 *l2tp-class-name*	
no protocol	

L2TP-class-name

43.2.4 virtual-ppp

-
-
-
-

no pseudowire	

43.2.5

б

2 Windows 2000 Server(LNS) L2TP

```
R3660# show running-config
Building configuration...
Current configuration : 868 bytes
!
hostname R3660
access-list 101 permit ip any 192.168.207.0 0.0.0.255
access-list 102 deny   ip any 192.168.207.0 0.0.0.255
access-list 102 permit ip any any
!
```

```
l2tp-class l2x
hostname branch
!
pseudowire-class pw
encapsulation l2tpv2
protocol l2tpv2 l2x
ip local interface GigabitEthernet 0/1
!
!
!
!
!
!
interface GigabitEthernet 0/0
ip address 192.168.201.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface GigabitEthernet 0/1
ip address 192.168.12.217 255.255.255.0
ip nat outside
duplex auto
speed auto
!
interface Null 0
!
interface Virtual-ppp 1
pseudowire 192.168.12.213 12 pw-class pw
ppp pap sent-username rgnos password 7 072C04211A01
ip mtu 1460
ip address negotiate
ip nat outside
!
ip nat inside source list 102 interface GigabitEthernet0/1 overload
ip nat inside source list 101 interface Virtual-PPP1 overload
ip route 0.0.0.0 0.0.0.0 GigabitEthernet 0/1 192.168.12.1
ip route 192.168.207.0 255.255.255.0 Virtual-ppp 1
!
line con 0
line aux 0
line vty 0 4
```

```
!
!
end
```

```
Microsoft Windows 2000 [Version 5.00.2195]
(C)        1985-2000 Microsoft Corp.
C:\>ipconfig /all
Windows 2000 IP Configuration
Host Name . . . . . . . . . . . . : BLIZZARD
Primary DNS Suffix  . . . . . . . :
Node Type . . . . . . . . . . . . : Broadcast
IP Routing Enabled. . . . . . . . : Yes
WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter         2:
Connection-specific DNS Suffix  . :
Description . . . . . . . . . . . : NE2000 Compatible
Physical Address. . . . . . . . . : 00-10-88-01-A5-C3
DHCP Enabled. . . . . . . . . . . : No
IP Address. . . . . . . . . . . . : 192.168.12.213
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : 192.168.12.1
DNS Servers . . . . . . . . . . . : 202.101.143.141

PPP adapter RAS Server (Dial In) Interface:
Connection-specific DNS Suffix  . :
Description . . . . . . . . . . . : WAN (PPP/SLIP) Interface
Physical Address. . . . . . . . . : 00-53-45-00-00-00
DHCP Enabled. . . . . . . . . . . : No
IP Address. . . . . . . . . . . . : 192.168.103.2
Subnet Mask . . . . . . . . . . . : 255.255.255.255
Default Gateway . . . . . . . . . :
DNS Servers . . . . . . . . . . . :

C:\>route print
===========================================================
Interface List
0x1 ........................... MS TCP Loopback interface
```

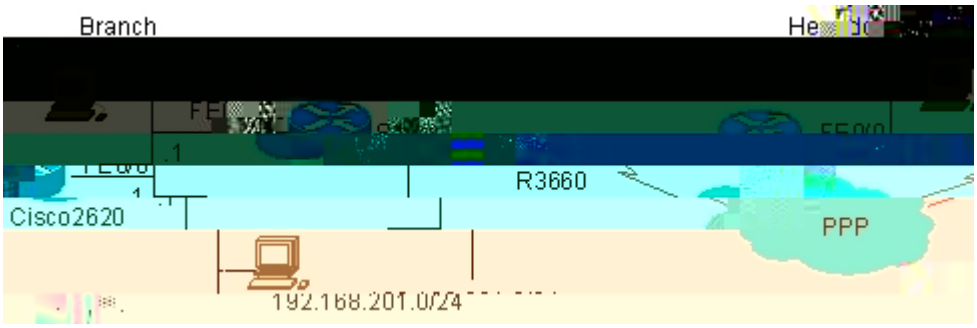
```
0x1000002 ...00 53 45 00 00 00 ...... WAN (PPP/SLIP) Interface
0x1000003 ...00 10 88 01 a5 c3 ...... Novell 2000 Adapter.
===========================================================
Active Routes:
Network Destination       Netmask         Gateway      Interface
Metric
0.0.0.0    0.0.0.0    192.168.12.1  192.168.12.213    1
127.0.0.0    255.0.0.0     127.0.0.1    127.0.0.1    1
192.168.12.0    255.255.255.0   192.168.12.213  192.168.12.213
1
192.168.12.213  255.255.255.255       127.0.0.1      127.0.0.1
1
192.168.12.217  255.255.255.255   192.168.12.213  192.168.12.213
1
192.168.12.255  255.255.255.255   192.168.12.213  192.168.12.213
1
192.168.103.2  255.255.255.255       127.0.0.1      127.0.0.1
1
192.168.103.6  255.255.255.255    192.168.103.2   192.168.103.2
1
224.0.0.0  224.0.0.0  192.168.12.213  192.168.12.213  1
255.255.255.255  255.255.255.255   192.168.12.213  192.168.12.213
1
Default Gateway:     192.168.12.1
===========================================================
Persistent Routes:
None
C:\>
```

&

```
192.168.201.64  255.255.255.192   192.168.201.78  192.168.201.78
1
192.168.201.78  255.255.255.255       127.0.0.1      127.0.0.1
1
192.168.201.255  255.255.255.255   192.168.201.78  192.168.201.78
1
224.0.0.0   224.0.0.0   192.168.201.78  192.168.201.78   1
  255.255.255.255  255.255.255.255   192.168.201.78
192.168.201.78      1
Default Gateway:    192.168.201.1
===========================================================
Persistent Routes:
Network Address         Netmask  Gateway Address  Metric
192.168.2.0    255.255.255.0     192.168.1.1      1
192.168.9.0    255.255.255.0    192.168.12.1      1
61.154.22.0    255.255.255.0    192.168.12.1      1
C:\WINNT\system32>ping 192.168.12.1
Pinging 192.168.12.1 with 32 bytes of data:
Reply from 192.168.12.1: bytes=32 time=50ms TTL=254
Reply from 192.168.12.1: bytes=32 time=20ms TTL=254
Reply from 192.168.12.1: bytes=32 time<10ms TTL=254
Reply from 192.168.12.1: bytes=32 time=60ms TTL=254
Ping statistics for 192.168.12.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  60ms, Average =  32ms
C:\WINNT\system32>ping 192.168.103.2
Pinging 192.168.103.2 with 32 bytes of data:
Reply from 192.168.103.2: bytes=32 time<10ms TTL=128
Reply from 192.168.103.2: bytes=32 time<10ms TTL=128
Reply from 192.168.103.2: bytes=32 time<10ms TTL=128
Reply from 192.168.103.2: bytes=32 time<10ms TTL=128
Ping statistics for 192.168.103.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  0ms, Average =  0ms
C:\WINNT\system32>
```

```
R3660# show ip nat translations
Pro Inside global     Inside local      Outside local     Outside
global
icmp 192.168.103.6:512 192.168.201.78:512 192.168.207.2:512
192.168.207.2:512
icmp 192.168.12.217:512 192.168.201.78:512 192.168.12.1:512
192.168.12.1:512
R3660# show ip route
Codes: C - connected, S - static,  R - RIP
O - OSPF, IA - OSPF inter area
E1 - OSPF external type 1, E2 - OSPF external type 2
Gateway of last resort is 192.168.12.1 to network 0.0.0.0
192.168.103.0/32 is subnetted, 2 subnets
C       192.168.103.6 is directly connected, Virtual-PPP1
C       192.168.103.2 is directly connected, Virtual-PPP1
C    192.168.12.0/24 is directly connected, GigabitEthernet0/1
C    192.168.201.0/24 is directly connected, GigabitEthernet0/0
S*   0.0.0.0/0 [1/0] via 192.168.12.1, GigabitEthernet0/1
R3660#
```

б



3 Cisco 2620(LNS) L2TP

```
R3660# show running-config
Building configuration...
Current configuration : 1136 bytes
!
```

```
hostname R3660
access-list 1 permit any
!
l2tp-class l2x
authentication
hostname branch
password share
!
pseudowire-class pw
encapsulation l2tpv2
protocol l2tpv2 l2x
ip local interface serial1/0
!
!
!
!
!
!
interface serial 1/0
encapsulation PPP
ip address 202.101.93.21 255.255.255.192
ip nat outside
!
interface serial 1/1
clock rate 64000
!
interface serial 1/2
clock rate 64000
!
interface serial 1/3
clock rate 64000
!
interface GigabitEthernet 0/0
ip address 192.168.201.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface GigabitEthernet 0/1
duplex auto
speed auto
!
```

```
interface Null 0
!
interface Virtual-ppp 1
pseudowire 202.101.93.23 7 pw-class pw
ppp pap sent-username rgnos password 7 072C04211A01
ip mtu 1460
ip address 192.168.103.3 255.255.255.0
!
router ospf
network 192.168.103.0 0.0.0.255 area 0.0.0.1
network 192.168.201.0 0.0.0.255 area 0.0.0.1
!
ip nat inside source list 1 interface Serial1/0 overload
ip route 0.0.0.0 0.0.0.0 serial 1/0
ip route 192.168.19.0 255.255.255.0 Virtual-ppp 1
!
line con 0
line aux 0
line vty 0 4
!
!
end
R3660#
```

```
C      202.101.93.0/26 is directly connected, Serial1/0
S*   0.0.0.0/0 is directly connected, Serial1/0
R3660#show arp
Protocol  Address         Age (min)  Hardware Addr   Type
Interface
Internet  192.168.201.213        3   0010.8801.a5c3  ARPA
GigabitEthernet0/0
Internet  192.168.201.1          -   00d0.f8fb.126e  ARPA
GigabitEthernet0/0
R3660#
```

```
Cisco2620# show running-config
Building configuration...
Current configuration : 1212 bytes
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Cisco2620
!
!
username 163 password 0 163
username rgnos password 0 rgnos
username 263 password 0 263
ip subnet-zero
!
!
no ip domain-lookup
!
vpdn enable
!
vpdn-group 1
! Default L2TP VPDN group
accept-dialin
protocol l2tp
virtual-template 1
l2tp tunnel password 7 0832444F1B1C
!
call rsvp-sync
```

```
!
interface GigabitEthernet0/0
ip address 192.168.19.1 255.255.255.0
duplex auto
speed 10
!
interface Serial0/0
ip address 202.101.93.23 255.255.255.192
encapsulation ppp
fair-queue
clockrate 2000000
!
interface Serial0/1
no ip address
shutdown
!
interface Virtual-Template1
ip address 192.168.103.2 255.255.255.0
ppp authentication pap
!
router ospf 100
log-adjacency-changes
network 192.168.103.0 0.0.0.255 area 1
!
ip classless
ip http server
!
!
voice-port 1/0/0
!
voice-port 1/0/1
!
dial-peer cor custom
!
!
gatekeeper
shutdown
!
!
line con 0
exec-timeout 0 0
line aux 0
```

```
Primary DNS Suffix  . . . . . :
Node Type . . . . . : Broadcast
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter         2:
Connection-specific DNS Suffix  . :
Description . . . . . : NE2000 Compatible
Physical Address. . . . . : 00-10-88-01-A5-C3
DHCP Enabled. . . . . : No
IP Address. . . . . : 192.168.201.213
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.201.1
DNS Servers . . . . . : 202.101.143.141

C:\>route print
===========================================================
Interface List
0x1 ........................... MS TCP Loopback interface
0x3000003 ...00 10 88 01 a5 c3 ...... Novell 2000 Adapter.
===========================================================
===========================================================Active
Routes:
Network Destination       Netmask         Gateway      Interface
Metric
0.0.0.0    0.0.0.0    192.168.201.1  192.168.201.213    1
127.0.0.0    255.0.0.0     127.0.0.1    127.0.0.1      1
192.168.201.0    255.255.255.0  192.168.201.213  192.168.201.213
1
192.168.201.213  255.255.255.255       127.0.0.1      127.0.0.1
1
192.168.201.255  255.255.255.255  192.168.201.213  192.168.201.213
1
224.0.0.0   224.0.0.0  192.168.201.213  192.168.201.213   1
255.255.255.255  255.255.255.255  192.168.201.213  192.168.201.213
1
Default Gateway:    192.168.201.1
===========================================================
Persistent Routes:
None
C:\>ping 192.168.103.2
Pinging 192.168.103.2 with 32 bytes of data:
Reply from 192.168.103.2: bytes=32 time=10ms TTL=0
```

```
Reply from 192.168.103.2: bytes=32 time<10ms TTL=0
Reply from 192.168.103.2: bytes=32 time<10ms TTL=0
Reply from 192.168.103.2: bytes=32 time<10ms TTL=0
Ping statistics for 192.168.103.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  10ms, Average =  2ms
C:\>ping 192.168.19.1
Pinging 192.168.19.1 with 32 bytes of data:
Reply from 192.168.19.1: bytes=32 time<10ms TTL=254
Reply from 192.168.19.1: bytes=32 time<10ms TTL=254
Reply from 192.168.19.1: bytes=32 time<10ms TTL=254
Reply from 192.168.19.1: bytes=32 time<10ms TTL=254
Ping statistics for 192.168.19.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  0ms, Average =  0ms
C:\>ping 202.101.93.23
Pinging 202.101.93.23 with 32 bytes of data:
Reply from 202.101.93.23: bytes=32 time<10ms TTL=254
Reply from 202.101.93.23: bytes=32 time<10ms TTL=254
Reply from 202.101.93.23: bytes=32 time<10ms TTL=254
Reply from 202.101.93.23: bytes=32 time<10ms TTL=254
Ping statistics for 202.101.93.23:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  0ms, Average =  0ms
C:\>
```

б

poolname *first-ip*
last-ip

43.3.3

username *user-name* **password** **{0|7}** *password*	

vpdn source-ip *ip-address*	
no vpdn source-ip *ip-address*	

43.3.5 virtual-template

-
-
-
-

interface virtual-template *number*	
no interface virtual-template *number*	

number

43.3.6 VPDN-group

›

›

›

›

›

›

›

›

›

vpdn-group *name*	
no vpdn-group *name*	

name

accept-dialin	
no accept-dialin	

protocol any l2tp pptp	
no protocol	

virtual-template *number*	

local name *name*	
no local name	

name

source-ip *src-ip*	
no source-ip	

src-ip

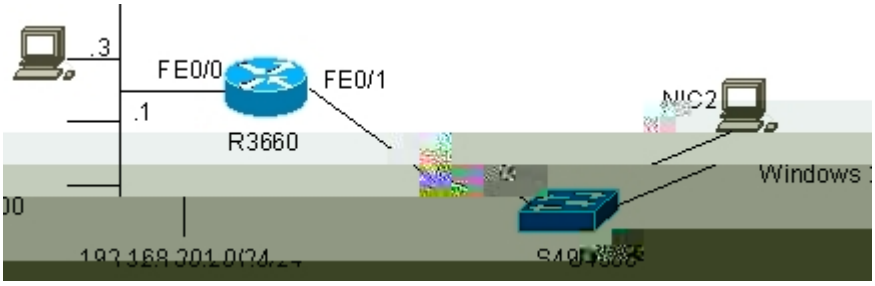
l2tp tunnel authentication	
no l2tp tunnel authentication	

l2tp tunnel retransmit retries *number* **timeout min max** *seconds*	
no l2tp tunnel retransmit retries timeout min max	
l2tp tunnel timeout no-session setup *seconds*	
no l2tp tunnel timeout no-session setup	

ño(5_‰1 Tf 0.04ßTc 2.ß74 0 Td (©etup)ê<
| •i• { #\ A { #•šüT£ °› €setup

43.3.7

б



4 Windows 2000(LAC) L2TP

```
R3660# show running-config
Building configuration...
Current configuration : 708 bytes
!
hostname R3660
!
vpdn enable
!
vpdn-group 1
! Default L2TP VPDN group
accept-dialin
protocol l2tp
virtual-template 1
!
!
!
username rgnos password 7 04251F083110
```

```
!
ip local pool vpdnusers 192.168.101.3 192.168.101.253
!
interface GigabitEthernet 0/0
ip address 192.168.201.1 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet 0/1
ip address 192.168.12.217 255.255.255.0
duplex auto
speed auto
!
interface Loopback 1
ip address 192.168.101.2 255.255.255.0
!
interface Null 0
!
interface Virtual-Template 1
ppp authentication pap
ip unnumbered Loopback 1
peer default ip address pool vpdnusers
!
!
line con 0
line aux 0
line vty 0 4
!
!
end
R3660#


Microsoft Windows 2000 [Version 5.00.2195]
(C)        1985-2000 Microsoft Corp.
C:\>ipconfig /all
Windows 2000 IP Configuration
Host Name . . . . . . . . . . . . : BLIZZARD
Primary DNS Suffix  . . . . . . . :
Node Type . . . . . . . . . . . . : Broadcast
IP Routing Enabled. . . . . . . . : No
WINS Proxy Enabled. . . . . . . . : No
```

```
R3660# show ip route
Codes: C - connected, S - static,  R - RIP
O - OSPF, IA - OSPF inter area
E1 - OSPF external type 1, E2 - OSPF external type 2
Gateway of last resort is not set
192.168.101.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.101.8/32 is directly connected, Virtual-Access1
C      192.168.101.0/24 is directly connected, Loopback1
C    192.168.12.0/24 is directly connected, GigabitEthernet0/1
C    192.168.201.0/24 is directly connected, GigabitEthernet0/0
R3660#ping 192.168.101.8
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.101.8, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
R3660#show vpdn tunnel
L2TP Tunnel Information Total tunnels 1
LocID RemID Remote Name   State  Remote Address  Port  Sessions L2TP
Class/
                                                      VPDN Group
7    8    BLIZZARD     est    192.168.12.213  1701  1      1
%No active PPTP tunnels
R3660#
R3660# show vpdn session
L2TP Session Information Total sessions 1
LocID      RemID      TunID      Username, Intf/      State
Last Chg
                             Vcid, Circuit
1       1         7         ,Vi1             est    00:02:08
%No active PPTP tunnels
R3660#


Microsoft Windows 2000 [Version 5.00.2195]
(C)         1985-2000 Microsoft Corp.
C:\>ipconfig /all
Windows 2000 IP Configuration
Host Name . . . . . . . . . . . . : BLIZZARD
Primary DNS Suffix  . . . . . . . :
```

```
Node Type . . . . . . . . . . . . : Broadcast
IP Routing Enabled. . . . . . . . : No
WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter         2:
Connection-specific DNS Suffix  . :
Description . . . . . . . . . . . : NE2000 Compatible
Physical Address. . . . . . . . . : 00-10-88-01-A5-C3
DHCP Enabled. . . . . . . . . . . : No
IP Address. . . . . . . . . . . . : 192.168.12.213
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : 192.168.12.1
DNS Servers . . . . . . . . . . . : 202.101.143.141
PPP adapter L2TP:
Connection-specific DNS Suffix  . :
Description . . . . . . . . . . . : WAN (PPP/SLIP) Interface
Physical Address. . . . . . . . . : 00-53-45-00-00-00
DHCP Enabled. . . . . . . . . . . : No
IP Address. . . . . . . . . . . . : 192.168.101.8
Subnet Mask . . . . . . . . . . . : 255.255.255.255
Default Gateway . . . . . . . . . : 192.168.101.8
DNS Servers . . . . . . . . . . . :
C:\>route print
===========================================================
Interface List
0x1 ........................... MS TCP Loopback interface
0x2000003 ...00 10 88 01 a5 c3 ...... Novell 2000 Adapter.
0xd000004 ...00 53 45 00 00 00 ...... WAN (PPP/SLIP) Interface
===========================================================
===========================================================
Active Routes:
Network Destination       Netmask         Gateway      Interface
Metric
0.0.0.0    0.0.0.0     192.168.12.1  192.168.12.213    2
0.0.0.0    0.0.0.0    192.168.101.8   192.168.101.8     1
127.0.0.0    255.0.0.0      127.0.0.1    127.0.0.1    1
192.168.12.0    255.255.255.0   192.168.12.213  192.168.12.213
1
192.168.12.213  255.255.255.255       127.0.0.1      127.0.0.1
1
192.168.12.217  255.255.255.255   192.168.12.213  192.168.12.213
1
```

```
192.168.12.255  255.255.255.255   192.168.12.213  192.168.12.213
1
192.168.101.2  255.255.255.255    192.168.101.8   192.168.101.8
1
192.168.101.8  255.255.255.255       127.0.0.1       127.0.0.1
1
192.168.101.255  255.255.255.255    192.168.101.8   192.168.101.8
1
```

```
Ping statistics for 192.168.201.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  0ms, Average =  0ms
C:\>ping 192.168.12.1
Pinging 192.168.12.1 with 32 bytes of data:
Reply from 192.168.12.1: bytes=32 time=10ms TTL=255
Reply from 192.168.12.1: bytes=32 time<10ms TTL=255
Reply from 192.168.12.1: bytes=32 time<10ms TTL=255
Reply from 192.168.12.1: bytes=32 time<10ms TTL=255
Ping statistics for 192.168.12.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum =  10ms, Average =  2ms
C:\>
```

б

5 Cisco 3640(LAC) L2TP

```
R3660# show running-config
Building configuration...
Current configuration : 766 bytes
!
hostname R3660
!
vpdn enable
!
vpdn-group 1
```

```
! Default L2TP VPDN group
accept-dialin
protocol l2tp
virtual-template 1
l2tp tunnel authentication
l2tp tunnel password share
!
!
!
username rgnos password 7 025144391715
!
ip local pool vpdnusers 192.168.101.3 192.168.101.253
!
interface GigabitEthernet 0/0
ip address 192.168.201.1 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet 0/1
ip address 192.168.12.217 255.255.255.0
duplex auto
speed auto
!
interface Loopback 1
ip address 192.168.101.2 255.255.255.0
!
interface Null 0
!
interface Virtual-Template 1
ppp authentication pap
ip unnumbered Loopback 1
peer default ip address pool vpdnusers
!
!
line con 0
line aux 0
line vty 0 4
!
!
end
R3660#
```

```
speed auto
duplex auto
!
interface GigabitEthernet2/1
ip address 192.168.203.1 255.255.255.0
duplex auto
speed auto
!
interface Serial3/0:1
ip address 192.168.1.2 255.255.255.0
!
interface Virtual-PPP1
ip address negotiated
no cdp enable
ppp pap sent-username rgnos password 0 rgnos
pseudowire 192.168.12.217 11 pw-class pw
!
no ip http server
ip classless
ip route 0.0.0.0 0.0.0.0 GigabitEthernet2/0 192.168.12.1
!
!
dial-peer cor custom
!
dial-peer voice 111 voip
session protocol sipv2
codec g711alaw
!
!
line con 0
exec-timeout 0 0
line aux 0
line vty 0 4
privilege level 15
no login
line vty 5 871
login
!
!
end
```

```
R3660# show ip route
Codes: C - connected, S - static,  R - RIP
O - OSPF, IA - OSPF inter area
E1 - OSPF external type 1, E2 - OSPF external type 2
Gateway of last resort is not set
192.168.101.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.101.9/32 is directly connected, Virtual-Access1
C      192.168.101.0/24 is directly connected, Loopback1
C    192.168.12.0/24 is directly connected, GigabitEthernet0/1
C    192.168.201.0/24 is directly con( )-6s( )J3(c)d(G)7(diE6(ighSP)6(F6( su0
```

```
C       132.11.10.0 is directly connected, Loopback0
C    192.168.1.0/24 is directly connected, Serial3/0:1
192.168.101.0/32 is subnetted, 2 subnets
C       192.168.101.9 is directly connected, Virtual-PPP1
```

6 Cisco 2620(LAC) L2TP

```
R3660# show running-config
Building configuration...
Current configuration : 989 bytes
!
hostname R3660
!
vpdn enable
!
vpdn-group 1
! Default L2TP VPDN group
accept-dialin
protocol l2tp
virtual-template 1
l2tp tunnel authentication
l2tp tunnel password share
!
!
!
username rgnos password 7 025144391715
username pc@i-net.com.cn password 7 127654431B
!
ip local pool vpdnusers 192.168.101.3 192.168.101.253
!
interface serial 1/0
encapsulation PPP
ip address 202.101.93.21 255.255.255.0
!
interface serial 1/1
clock rate 64000
```

```
!
interface serial 1/2
clock rate 64000
!
interface serial 1/3
clock rate 64000
!
interface GigabitEthernet 0/0
duplex auto
speed auto
!
interface GigabitEthernet 0/1
ip address 192.168.19.1 255.255.255.0
duplex auto
speed auto
!
interface Loopback 1
ip address 192.168.101.2 255.255.255.0
!
interface Null 0
!
interface Virtual-Template 1
ppp authentication pap
ip unnumbered Loopback 1
peer default ip address pool vpdnusers
!
!
line con 0
line aux 0
line vty 0 4
!
!
end
R3660#


Cisco2620# show running-config
Building configuration...
Current configuration : 1677 bytes
!
version 12.3
service timestamps debug uptime
```

```
service timestamps log uptime
no service password-encryption
no service dhcp
!
hostname Cisco2620
!
!
username pc password 0 1111
username 163 password 0 163
no aaa new-model
ip subnet-zero
!
!
!
vpdn enable
!
vpdn-group 1
request-dialin
protocol l2tp
domain i-net.com.cn
initiate-to ip 202.101.93.21
l2tp tunnel password 7 0832444F1B1C
!
interface GigabitEthernet0/0
ip address 192.168.7.1 255.255.255.0
duplex auto
speed 10
!
interface Serial0/0
ip address 202.101.93.23 255.255.255.0
encapsulation ppp
fair-queue
clockrate 2000000
!
interface Serial0/1
no ip address
shutdown
!
interface Async65
ip address 5.5.5.5 255.255.255.0
encapsulation ppp
dialer in-band
```

```
dialer idle-timeout 30000
dialer string 8435
dialer-group 1
async mode dedicated
peer default ip address 5.5.5.6
ppp authentication pap
!
no ip http server
ip classless
!
dialer-list 1 protocol ip permit
!
!
line con 0
exec-timeout 0 0
line aux 0
login local
modem InOut
transport input all
autoselect during-login
autoselect ppp
line vty 0 4
privilege level 15
no login
line vty 5 15
login
!
no scheduler allocate
end
Cisco2620#
```

43.4 L2TP

43.4.1 L2TP

show vpdn tunne session **show vpdn tunnel session**	
debug vpdn error	
no debug vpdn error	
debug vpdn event	
no debug vpdn event	
debug vpdn packet	

```
%No active PPTP tunnels
Ruijie# show vpdn
L2TP Tunnel and Session Information Total tunnels 1 sessions 1
LocID RemID Remote Name   State  Remote Address  Port  Sessions L2TP
Class/
                                                        VPDN Group
1    35390 C3640        est    192.168.12.242  1701  1       1
LocID     RemID     TunID     Username, Intf/     State  Last Chg
                            Vcid, Circuit
1         1261      1         rgnos,Vi1              est
01:04:45
%No active PPTP tunnels
Ruijie#
```

```
Ruijie# debug vpdn error
vpdn protocol errors debugging is on
Ruijie# debug vpdn event
vpdn events debugging is on
Ruijie# debug vpdn packet
vpdn packet debugging is on
Ruijie# show debug
VPDN:
vpdn events debugging is on
vpdn protocol errors debugging is on
vpdn packet debugging is on
Ruijie#
VPDN PROCESS From tunnel: Received 158 byte pak
L2X: UDP socket write 168 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
L2X: UDP socket write 40 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
VPDN PROCESS From tunnel: Pak consumed
VPDN PROCESS From tunnel: Received 70 byte pak
L2X: UDP socket write 40 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
VPDN PROCESS From tunnel: Pak consumed
VPDN PROCESS From tunnel: Received 76 byte pak
```

```
Get virtual-access from free queue: Virtual-Access1
Clone virtual-access from interface Virtual-Template1
L2X: UDP socket write 56 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
L2X: UDP socket write 40 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
VPDN PROCESS From tunnel: Pak consumed
VPDN PROCESS From tunnel: Received 76 byte pak
L2X: UDP socket write 40 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
Vi1 Tnl/Sn 3/1 L2TP: Virtual interface created for unknown, bandwidth
1024 Kbps
Vi1 Tnl/Sn 3/1 L2TP: VPDN session up
VPDN PROCESS From tunnel: Pak consumed
VPDN PROCESS From tunnel: Received 50 byte pak
Vi1 VPDN PROCESS From tunnel: Queue 14 byte pak to ppp parse and iqueue
Vi1 VPDN PROCESS From tunnel: Pak send successful
%UPDOWN: Interface Virtual-Access1, changed state to up
Vi1 VPDN PROCESS Into tunnel: Sending 54 byte pak
L2X: UDP socket write 54 bytes, 255.255.255.255(1701) to
4.83.68.68(1701)
VPDN PROCESS From tunnel: Received 50 byte pak
Vi1 VPDN PROCESS From tunnel: Queue 14 byte pak to ppp parse and iqueue
Vi1 VPDN PROCESS From tunnel: Pak send successful
Vi1 VPDN PROCESS Into tunnel: Sending 50 byte pak
L2X: UDP socket write 50 bytes, 255.255.255.255(1701) to
4.83.68.68(1701)
Vi1 VPDN PROCESS Into tunnel: Sending 54 byte pak
L2X: UDP socket write 54 bytes, 255.255.255.255(1701) to
4.83.68.68(1701)
VPDN PROCESS From tunnel: Received 50 byte pak
Vi1 VPDN PROCESS From tunnel: Queue 14 byte pak to ppp parse and iqueue
Vi1 VPDN PROCESS From tunnel: Pak send successful
Vi1 VPDN PROCESS Into tunnel: Sending 50 byte pak
L2X: UDP socket write 50 bytes, 255.255.255.255(1701) to
4.83.68.68(1701)
Vi1 VPDN PROCESS Into tunnel: Sending 54 byte pak
L2X: UDP socket write 54 bytes, 255.255.255.255(1701) to
4.83.68.68(1701)
VPDN PROCESS From tunnel: Received 50 byte pak
Vi1 VPDN PROCESS From tunnel: Queue 14 byte pak to ppp parse and iqueue
Vi1 VPDN PROCESS From tunnel: Pak send successful
```

```
Vi1 VPDN PROCESS Into tunnel: Sending 50 byte pak
L2X: UDP socket write 50 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
Vi1 VPDN PROCESS Into tunnel: Sending 54 byte pak
L2X: UDP socket write 54 bytes, 192.168.12.217(1701) to
192.168.12.242(1701)
VPDN PROCESS From tunnel: Received 54 byte pak
```

```
C      192.168.101.0/24 is directly connected, Virtual-Access1
C    192.168.12.0/24 is directly connected, GigabitEthernet0
C    192.168.201.0/24 is directly connected, Ethernet0
Ruijie#
```

£ Ò Œp

```
Tnl 14 L2TP: Tunnel auth failed for BLIZZARD
Tnl 14 L2TP: Expected
9E 8D 7A 8E 78 EA 41 9F A1 74 01 21 DE 4F F3 F0
Tnl 14 L2TP: Got
84 E5 62 69 AE 46 A5 98 4E FE E2 38 EE F2 B7 E2
Ruijie# no debug all
All possible debugging has been turned off
Ruijie#
```

Y

l2x-events

l2x-evetns

```
Ruijie# show vpdn tunnel
%No active L2TP tunnels
%No active PPTP tunnels
Ruijie# no debug all
All possible debugging has been turned off
Ruijie# debug vpdn l2x-events
L2X protocol events debugging is on
Ruijie#
L2TP: I SCCRQ from C3640 tnl 26656
New tunnel created for remote C3640, address 192.168.12.242
Tnl 0 L2TP: Got a challenge in SCCRQ, C3640
Tnl 20 L2TP: O SCCRP  to C3640 tnlid 26656
Tnl 20 L2TP: Control channel retransmit delay set to 1 seconds
Tnl 20 L2TP: Tunnel state change from idle to wait-ctl-conn
Tnl 20 L2TP: I SCCCN from C3640 tnl 26656
Tnl 20 L2TP: Got a Challenge Response in SCCCN, C3640
Tnl 20 L2TP: Tunnel Authentication success
Tnl 20 L2TP: Tunnel state change from wait-ctl-conn to established
Tnl 20 L2TP: SM State established
Tnl 20 L2TP: I ICRQ from C3640 tnl 26656
Tnl/Sn 20/1 L2TP: Accepted ICRQ, new session created
Tnl/Sn 20/1 L2TP: O ICRP to C3640 26656/1279
Tnl/Sn 20/1 L2TP: Session state change from idle to wait-connect
Tnl 20 L2TP: Control channel retransmit delay set to 1 seconds
Tnl/Sn 20/1 L2TP: I ICCN from C3640 tnl 26656, cl 1279
Tnl/Sn 20/1 L2TP: Session state change from wait-connect to
wait-for-service-sel
```

```
ection-iccn
Vi1 Tnl/Sn 20/1 L2TP: Session state change from
wait-for-service-selection- iccn to established
%UPDOWN: Interface Virtual-Access1, changed state to up
%UPDOWN: Line protocol on Interface Virtual-Access1, changed state
to up
Ruijie# show ip route
Codes: C - connected, S - static,  R - RIP
O - OSPF, IA - OSPF inter area
E1 - OSPF external type 1, E2 - OSPF external type 2
Gateway of last resort is not set
192.168.101.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.101.7/32 is directly connected, Virtual-Access1
C      192.168.101.0/24 is directly connected, Virtual-Access1
C    192.168.12.0/24 is directly connected, GigabitEthernet0
C    192.168.201.0/24 is directly connected, Ethernet0
Ruijie#
```

```
Tnl 21 L2TP: Control channel retransmit delay set to 1 seconds
Tnl 21 L2TP: Tunnel state change from idle to wait-ctl-reply
Tnl 21 L2TP: SM State wait-ctl-reply
Tnl 21 L2TP: O Resend SCCRQ, flg TLS, ver 2, len 96, tnl 0, ns 0, nr
0
Tnl 21 L2TP: Control channel retransmit delay set to 1 seconds
Tnl 21 L2TP: I SCCRP from
Tnl 21 L2TP: O SCCCN  to BLIZZARD tnlid 40
Tnl 21 L2TP: Control channel retransmit delay set to 1 seconds
Tnl 21 L2TP: Tunnel state change from wait-ctl-reply to established
Tnl 21 L2TP: SM State established
Vi1 Tnl/Sn 21/1 L2TP: O ICRQ to BLIZZARD 40/0
Vi1 Tnl/Sn 21/1 L2TP: Control channel retransmit delay set to 1 seconds
Vi1 Tnl/Sn 21/1 L2TP: Session state change from wait-for-tunnel to
wait-reply
Vi1 Tnl/Sn 21/1 L2TP: I ICRP from BLIZZARD
Vi1 Tnl/Sn 21/1 L2TP: O ICCN to BLIZZARD 40/1
Vi1 Tnl/Sn 21/1 L2TP: Control channel retransmit delay set to 1 seconds
Vi1 Tnl/Sn 21/1 L2TP: Session state change from wait-reply to
established
%UPDOWN: Interface Virtual-PPP1, changed state to up
%UPDOWN: Line protocol on Interface Virtual-PPP1, changed state to
up
Ruijie# show vpdn
L2TP Tunnel and Session Information Total tunnels 1 sessions 1
LocID RemID Remote Name   State  Remote Address  Port  Sessions L2TP
Class/
                                                        VPDN Group
21    40    BLIZZARD     est    192.168.12.213  1701  1
LocID    RemID   TunID    Username, Intf/    State  Last Chg
                             Vcid, Circuit
1      1         21        13,Vi1          est    00:00:27
%No active PPTP tunnels
Ruijie#
```

l2x-packets

l2x-packets

```
Ruijie# no debug all
```

```
All possible debugging has been turned off
Ruijie# debug vpdn l2x-packets
L2X control packets debugging is on
Ruijie# show vpdn
%No active L2TP tunnels
%No active PPTP tunnels
Ruijie#
L2TP: I SCCRQ from C3640 tnl 18889
L2X: Parse  AVP 0, len 8, flag 0x8000 (M)
L2X: Parse SCCRQ
L2X: Parse  AVP 2, len 8, flag 0x8000 (M)
L2X: Protocol Ver 1
L2X: Parse  AVP 6, len 8, flag 0x0
L2X: Firmware Ver 0x1130
L2X: Parse  AVP 7, len 11, flag 0x8000 (M)
L2X: Hostname C3640
L2X: Parse  AVP 8, len 25, flag 0x0
L2X: Vendor Name Cisco Systems, Inc.
L2X: Parse  AVP 10, len 8, flag 0x8000 (M)
L2X: Rx Window Size 800
L2X: Parse  AVP 11, len 22, flag 0x8000 (M)
L2X: Chlng
       98 20 4E 34 6A 4C E1 E7 FA CF 58 07 FF 4E 56 A3
L2X: Parse  AVP 9, len 8, flag 0x8000 (M)
L2X: Assigned Tunnel ID 18889
L2X: Parse  AVP 3, len 10, flag 0x8000 (M)
L2X: Framing Cap 0x3
L2X: Parse  AVP 4, len 10, flag 0x8000 (M)
L2X: Bearer Cap 0x3
L2X: No missing AVPs in SCCRQ
L2X: I SCCRQ, flg TLS, ver 2, len 130, tnl 0, ns 0, nr 0 contiguous
pak, size 130
C8 02 00 82 00 00 00 00 00 00 00 00 80 08 00 00
00 00 00 01 80 08 00 00 00 02 01 00 00 08 00 00
00 06 11 30 80 0B 00 00 00 07 43 33 36 34 30 00
19 00 00 00 08 43 69 73 63 6F 20 53 79 73 74 65
6D 73 2C 20 49 6E 63 2E ...

Tnl 22 L2TP: O SCCRP  to C3640 tnlid 18889
Tnl 22 L2TP: O SCCRP, flg TLS, ver 2, len 140, tnl 18889, ns 0, nr
1
C8 02 00 8C 49 C9 00 00 00 00 00 01 80 08 00 00
00 00 00 02 80 08 00 00 00 02 01 00 80 0A 00 00
```

```
00 03 00 00 00 01 80 0A 00 00 00 04 00 00 00 00
00 08 00 00 00 06 11 30 80 0A 00 00 00 07 52 36
32 31 00 0E 00 00 00 08 ...

Tnl 22 L2TP: O ZLB ctrl ack, flg TLS, ver 2, len 12, tnl 18889, ns
1, nr 1
C8 02 00 0C 49 C9 00 00 00 01 00 01
Tnl 22 L2TP: Parse  AVP 0, len 8, flag 0x8000 (M)
Tnl 22 L2TP: Parse SCCCN
Tnl 22 L2TP: I SCCCN from C3640 tnl 18889
Tnl 22 L2TP: Parse  AVP 13, len 22, flag 0x8000 (M)
Tnl 22 L2TP: Chlng Resp
5C D5 A4 37 36 A6 7D 0F FE EF 22 48 B8 DF F5 12
Tnl 22 L2TP: No missing AVPs in SCCCN
Tnl 22 L2TP: I SCCCN, flg TLS, ver 2, len 42, tnl 22, ns 1, nr 1 contiguous
pak, size 42
C8 02 00 2A 00 16 00 00 00 01 00 01 80 08 00 00
00 00 00 03 80 16 00 00 00 0D 5C D5 A4 37 36 A6
7D 0F FE EF 22 48 B8 DF F5 12
Tnl 22 L2TP: O ZLB ctrl ack, flg TLS, ver 2, len 12, tnl 18889, ns
1, nr 2
C8 02 00 0C 49 C9 00 00 00 01 00 02
Tnl 22 L2TP: Parse  AVP 0, len 8, flag 0x8000 (M)
Tnl 22 L2TP: Parse ICRQ
Tnl 22 L2TP: I ICRQ from C3640 tnl 18889
Tnl 22 L2TP: Parse  AVP 15, len 10, flag 0x8000 (M)
Tnl 22 L2TP: Serial Number -1714567290
Tnl 22 L2TP: Parse  AVP 14, len 8, flag 0x8000 (M)
Tnl 22 L2TP: Assigned Call ID 1280
Tnl 22 L2TP: Parse  AVP 18, len 10, flag 0x8000 (M)
Tnl 22 L2TP: Bearer Type 0
Tnl 22 L2TP: No missing AVPs in ICRQ
Tnl 22 L2TP: I ICRQ, flg TLS, ver 2, len 48, tnl 22, ns 2, nr 1 contiguous
pak,size 48
C8 02 00 30 00 16 00 00 00 02 00 01 80 08 00 00
00 00 00 0A 80 0A 00 00 00 0F 99 CD C7 86 80 08
00 00 00 0E 05 00 80 0A 00 00 00 12 00 00 00 00
Tnl/Sn 22/1 L2TP: O ICRP to C3640 18889/1280
Tnl/Sn 22/1 L2TP: O ICRP, flg TLS, ver 2, len 28, tnl 18889, lsid 1,
rsid 1280,ns 1, nr 3
C8 02 00 1C 49 C9 05 00 00 01 00 03 80 08 00 00
00 00 00 0B 80 08 00 00 00 0E 00 01
```

```
Ruijie#
```

l2x-packets

```
Ruijie# no debug all
All possible debugging has been turned off
Ruijie# debug vpdn l2x-packets
L2X control packets debugging is on
Ruijie# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# interface virtual-ppp 1
Ruijie(config-if)# no shutdown
Ruijie(config-if)# end
Ruijie#
Tnl 21 L2TP: O SCCRQ
Tnl 21 L2TP: O SCCRQ, flg TLS, ver 2, len 96, tnl 0, ns 0, nr 0
C8 02 00 60 00 00 00 00 00 00 00 80 08 00 00
00 00 00 01 80 08 00 00 00 02 01 00 80 0A 00 00
00 03 00 00 00 01 80 0A 00 00 00 04 00 00 00 00
00 08 00 00 00 06 11 30 80 0A 00 00 00 07 52 36
32 31 00 0E 00 00 00 08 ...
Tnl 21 L2TP: Parse  AVP 0, len 8, flag 0x8000 (M)
Tnl 21 L2TP: Parse SCCRP
Tnl 21 L2TP: Parse  AVP 2, len 8, flag 0x8000 (M)
Tnl 21 L2TP: Protocol Ver 1
Tnl 21 L2TP: Parse  AVP 3, len 10, flag 0x8000 (M)
Tnl 21 L2TP: Framing Cap 0x1
Tnl 21 L2TP: Parse  AVP 4, len 10, flag 0x8000 (M)
Tnl 21 L2TP: Bearer Cap 0x0
Tnl 21 L2TP: Parse  AVP 6, len 8, flag 0x0
Tnl 21 L2TP: Firmware Ver 0x500
Tnl 21 L2TP: Parse  AVP 7, len 14, flag 0x8000 (M)
Tnl 21 L2TP: Hostname BLIZZARD
Tnl 21 L2TP: Parse  AVP 8, len 15, flag 0x0
Tnl 21 L2TP: Vendor Name Microsoft
Tnl 21 L2TP: Parse  AVP 9, len 8, flag 0x8000 (M)
Tnl 21 L2TP: Assigned Tunnel ID 41
Tnl 21 L2TP: Parse  AVP 10, len 8, flag 0x8000 (M)
Tnl 21 L2TP: Rx Window Size 8
Tnl 21 L2TP: No missing AVPs in SCCRP
Tnl 21 L2TP: I SCCRP, flg TLS, ver 2, len 101, tnl 21, ns 0, nr 1
contiguous pak, size 101
```

```
C8 02 00 65 00 15 00 00 00 00 00 01 80 08 00 00
00 00 00 02 80 08 00 00 00 02 01 00 80 0A 00 00
00 03 00 00 00 01 80 0A 00 00 00 04 00 00 00 00
```

```
%UPDOWN: Interface Virtual-PPP1, changed state to up
%UPDOWN: Line protocol on Interface Virtual-PPP1, changed state to
up
Ruijie# show vpdn
L2TP Tunnel and Session Information Total tunnels 1 sessions 1
LocID RemID Remote Name   State  Remote Address  Port  Sessions L2TP
Class/
                                                        VPDN Group
21    41    BLIZZARD     est    192.168.12.213  1701  1
LocID     RemID     TunID     Username, Intf/     State  Last Chg
                            Vcid, Circuit
1         1         21        13,Vi1              est    00:00:13
%No active PPTP tunnels
Ruijie#
```

43.4.2 L2TP

clear vpdn tunnel pptp l2tp *remote-host-name*

```
%CHANGED: Interface Virtual-Access1, changed state to
administratively down
Ruijie# show vpdn
%No active L2TP tunnels
%No active PPTP tunnels
Ruijie#
```

43.4.3

’

’

’

’

’

’

ip domain-lookup **ip cef**

’

’

44 AAA

44.1 AAA

Â

Â

Â

Â

Â

Â

Â

44.1.1 AAA

44.1.2

&

44.3.2

Step 1	**configure terminal**	
Step 2	**aaa authentication login default group radius local**	“ ”

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authentication login** *test* **group radius local**	“ ”
Step 4	**line vty** *2*	
Step 5	**login authentication** *test*	“ ”

44.3.3

Â

Â

Â

Â

Â

al7 Tc 4.a16l7eTd [(En)-5(able7)Tj /C

aaa new-model

“ ”

aaa authentication login

Step 1	**configure**	
Step 2	**aaa new-model**	
Step 3	**aaa authentication login default** *list-name method1 method2*	
Step 4	**line vty *line-num***	
Step 5	**login authentication default** *list-name*	

list-name *method*

none

aaa

authentication login default group radius none

none

C ̈ ̧ Y

Step 1	**configure terminal**	
Step 2	**username** *name* **password** *password*	

Step 4	**end**	
Step 5	**show radius server**	

“

”

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authentication login default** *list-name* **group radius**	
Step 4	**end**	
Step 5	**show aaa method-list**	
Step 6	**configure terminal**	
Step 7	**line vty** *line-num*	
Step 8	**login authentication default** *list-name*	
Step 9	**end**	
Step10	**show running-config**	

44.3.6 AAA Enable

show privilege

“ ”

Step 1	**configure terminal**	
Step 2	**aaa new-model**	

Step 3	**aaa authentication enable default** *method1* *method2*	

method

none

enable

none

Step 1 configure terminal

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authentication ppp default |** *list-name method1 method2*	
Step 4	**interface** *interface-type interface-number*	
Step 5	**ppp authentication | *list-name***	

“ ”

44.3.8 802.1x AAA

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authentication dot1x default** *list-name method1 method2*	
Step 4	**dot1x authentication** *list-name*	

“ ”

44.3.9 web AAA

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authentication web default** *list-name method1 method2*	

“ ”

44.3.10 web

oefig(u)-5rep]erpi(n)-5al

```
Ruijie(config)# web-auth authentication  portal

Ruijie(config)# line vty 0
Ruijie(config-line)# login authentication test
Ruijie(config-line)# end
Ruijie# show running-config
!
aaa new-model
!
!
aaa authentication login test group radius local
aaa authentication web portal group radius local
aaa local user allow public account
username Ruijie password 0 starnet
!
radius-server host 192.168.217.64
radius-server key 7 093b100133
!
web-auth authentication  portal

line con 0
line vty 0
login authentication test
line vty 1 4
!
!
```

44.3.12

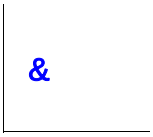
```
Ruijie(config)# radius-server host 192.168.217.64
Ruijie(config)# radius-server key test
Ruijie(config)# aaa authentication login test group radius local
Ruijie(config)# aaa authentication login terms none
Ruijie(config)# line tty 1 4
Ruijie(config-line)# login authentication terms
Ruijie(config-line)# exit
Ruijie(config)# line tty 5 16
Ruijie(config-line)# login authentication test
Ruijie(config-line)# exit
Ruijie(config)# line vty 0 4
Ruijie(config-line)# login authentication test
Ruijie(config-line)# end
Ruijie# show running-config
!
```

44.4.1

Â

Â

Â



&

“ ”

44.4.2

Â “ ”

Â

“ ”

Â

Step 3	**aaa authorization exec default** *list-name method1 method2*	
Step 4	**aaa authorization network default** *list-name method1 method2*	

44.4.4 AAA Exec

show privilege

aaa authorization exec

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authorization exec default** *list-name method1 method2*	
Step 4	**line vty** *line-num*	
Step 5	**authorization exec default** *list-name*	

list-name *method*

none

aaa

authorization exec default group radius none

Step 1	**local**	
Step 2	**none**	
Step 3	**group radius**	
Step 4	**group tacacs+**	

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authorization exec default** *list-name* **group radius**	
Step 4	**end**	
Step 5	**show aaa method-list**	
Step 6	**configure terminal**	
Step 7	**line vty** *line-num*	
Step 8	**authorization exec default** *list-name*	
Step 9	**end**	
Step10	**show running-config**	

```
Ruijie# configure terminal
Ruijie(config)# aaa new-model
Ruijie(config)# radius-server host 192.168.217.64
Ruijie(config)# radius-server key test
Ruijie(config)# username ruijie password ruijie
Ruijie(config)# username ruijie privilege 6
Ruijie(config)# aaa authentication login mlist1 local
Ruijie(config)# aaa authorization exec mlist2 group radius local
Ruijie(config)# line vty 0 4
Ruijie(config-line)# login authentication mlist1
Ruijie(config-line)# authorization exec mlist2
Ruijie(config)# end
Ruijie# show running-config
aaa new-model
!
aaa authorization exec mlist2 group radius local
aaa authentication login mlist1 local
```

```
!
username ruijie password ruijie
username ruijie privilege 6
!
radius-server host 192.168.217.64
radius-server key 7 093b100133
!
line con 0
line vty 0 4
 authorization exec mlist2
 login authentication mlist1
!
End
```

44.4.5 AAA Network

∋ ∉

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa authorization network default** *list-name* **group radius**	

```
Ruijie# configure terminal
Ruijie(config)# aaa new-model
Ruijie(config)# radius-server host 192.168.217.64
Ruijie(config)# radius-server key test
```

&

44.5.2

Â

Â

Â

44.5.3 AAA Exec

list-name *method*

none

&	**start-stop**

“ ”

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa accounting exec default** *list-name* **start-stop group radius**	
Step 4	**end**	
Step 5	**show aaa method-list**	
Step 6	**configure terminal**	
Step 7	**line vty line-num**	
Step 8	**accounting exec default** *list-name*	
Step 9	**end**	
Step10	**show running-config**	

```
Ruijie# config
Ruijie(config)# aaa new-model
Ruijie(config)# radius-server host 192.168.217.64
Ruijie(config)# radius-server key test
```

```
Ruijie(config)# username ruijie password ruijie
Ruijie(config)# aaa authentication login auth local
Ruijie(config)# aaa accounting exec acct start-stop group radius
Ruijie(config)# line vty 0 4
Ruijie(config-line)# login authentication auth
Ruijie(config-line)# accounting exec acct
Ruijie(config)# end
Ruijie# show running-config
!
aaa new-model
!
aaa accounting exec acct start-stop group radius
aaa authentication login auth local
!
username ruijie password ruijie
!
radius-server host 192.168.217.64
radius-server key 7 093b100133
!
line con 0
line vty 0 4
 accounting exec acct
 login authentication auth
!
end
```

44.5.4 AAA Network

&

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3	**aaa accounting network default** *list-name* **start-stop** *method1 method2*	

list-name *method*

none

“ ”

Step 1	**configure terminal**	
Step 2	**aaa new-model**	
Step 3		

44.6 AAA

Step 1	

Step 3	**aaa local authentication attempts** *<1-2147483647>*	
Step 4	**aaa local authentication lockout-time** *<1-2147483647>*	
Step 5	**show aaa user lockout {all | user-name** *word*	
Step 6	**clear aaa local user lockout all user-name** *word*	
Step 7	**end**	

&	

44.9 AAA

Â
Â
Â

&

Â

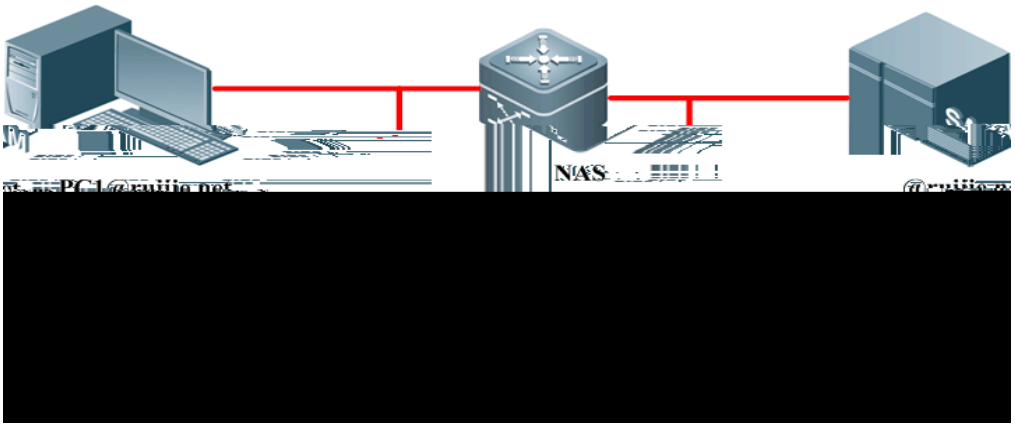
Â

Â

Â

Â

&



2

44.9.2 AAA

Step 1	**configure terminal**	
Step 2	**aaa new-model**	

“ ”

Step 1	**configure terminal**	
Step 2	**aaa authentication dot1x default** *list-name method1 method2*	
Step 3	**aaa accounting network default** *list-name* **start-stop** *method1 method2*	
Step 4	**aaa authorization network default** *list-name method1 method2*	

“ ” “ ” “ ”

Step 1	**configure terminal**	
Step 2	**aaa domain enable**	

Step 1	**configure terminal**	
Step 2	**aaa domain** *domain-name*	*domain-name*

&

Step 1	**authentication dot1x default** *list-name*	
Step 2	**accounting network default** *list-name*	
Step 3	**authorization network default** *list-name*	

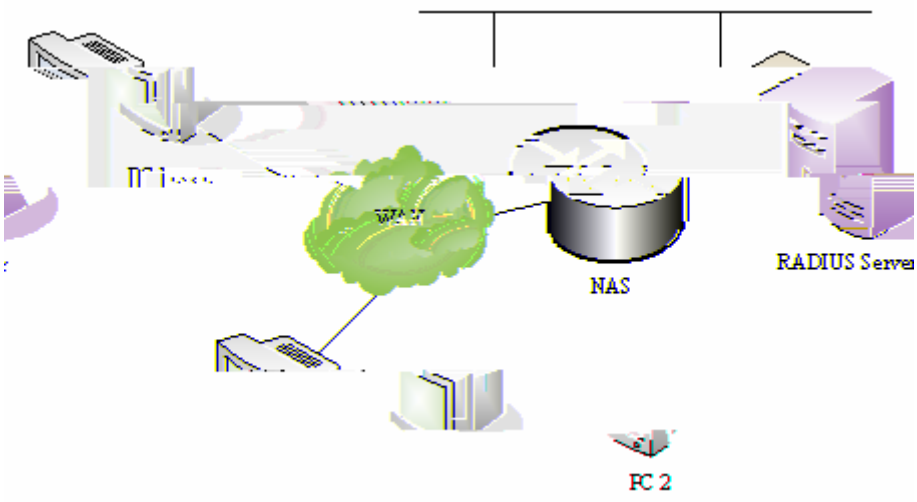
dot1x authentication *authen-list-name* **dot1x accounting** *acct-list-name* *authen-list-name* *acct-list-name*

“ ”

```
Selected method list:
 authentication dot1x default
```

45 RADIUS

45.1 RADIUS



1 RADIUS

45.2 RADIUS

，

，**aaa authentication** **aaa authentication**

，

，

，

45.2.1 RADIUS

configure terminal	
radius-server host *ip-address* **auth-port** *port* **acct-port** *port*	
radius-server key *string*	
radius-server retransmit *retries*	
radius-server timeout *seconds* **radius-server deadtime** *minutes*	

ID		TYPE

&

```
Ruijie# show radius vendor-specific
id    vendor-specific     type-value
----- -------------------- ----------
1     max down-rate       76
2     qos                77
3     user ip             3
4     vlan id             4
5     version to client    5
6     net ip             6
7     user name           7
8     password           8
9     file-diractory       9
10    file-count          10
11    file-name-0         11
12    file-name-1         12
13    file-name-2         13
14    file-name-3         14
15    file-name-4         15
16    max up-rate         75
17    version to server    17
18    flux-max-high32      18
19    flux-max-low32       19
20    proxy-avoid         20
21    dailup-avoid         21
22    ip privilige         22
23    login privilige      42
24    limit to user number 50

Ruijie# configure
Ruijie(config)# radius attribute 24 vendor-type 67
Ruijie(config)# show radius vendor-specific
id    vendor-specific     type-value
----- -------------------- ----------
1     max down-rate       76
2     qos                77
```

```
3     user ip             3
4     vlan id             4
5     version to client    5
6     net ip              6
7     user name            7
8     password            8
9     file-diractory       9
10    file-count          10
11    file-name-0          11
12    file-name-1          12
13    file-name-2          13
14    file-name-3          14
15    file-name-4          15
16    max up-rate          75
17    version to server    17
18    flux-max-high32      18
19    flux-max-low32       19
20    proxy-avoid          20
21    dailup-avoid         21
22    ip privilige         22
23    login privilige      42
24    limit to user number 50
Ruijie(config)#
Ruijie(config)#
```

45.3 RADIUS

debug radius event	

45.4 RADIUS

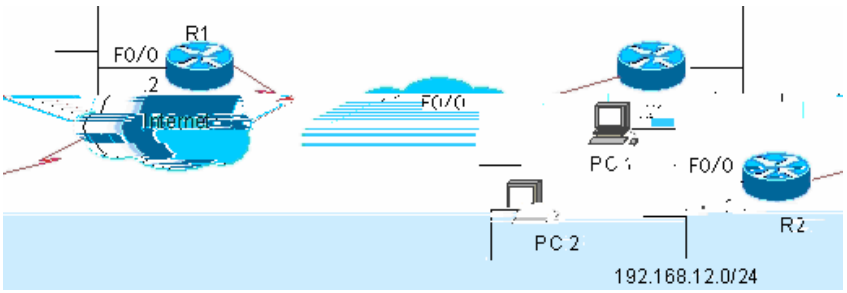
&

```
Ruijie# configure terminal
Ruijie(config)# aaa new-model
Ruijie(config)# radius-server host 192.168.12.219
auth-port 1645 acct-port 1646
Ruijie(config)# radius-server key aaa
Ruijie(config)# aaa authentication login test group radius
Ruijie(config)# end
Ruijie# show radius server
Server IP:       192.168.12.219
Accounting Port: 1646
Authen  Port:    1645
Server State:    Ready

Ruijie# configure terminal
Ruijie(config)# line vty 0
Ruijie(config-line)# login authentication test
Ruijie(config-line)# end
Ruijie# show running-config
!
aaa new-model
!
!
aaa authentication login test group radius
!
username ruijie password 0 starnet
!
radius-server host 192.168.12.219 auth-port 1645 acct-port 1646
!
line con 0
line vty 0
login authentication test
line vty 1 4
!
```

ω̃ ↑ ⌐

46 VRRP

46.1



1 VRRP

46.2 VRRP

46.2.1

46.3 VRRP

46.3.1 VRRP

-
-
-
-
-
-
-
-
-
-

46.3.2 VRRP

no vrrp *group* **ip** *ipaddress* **secondary**	

&

0 0 Q Tf0.004 Tc 4.6394 0 0 7 0 0 Tm 0 0 Tf 1 0 0 1 0 0 Tm

&

46.3.7 VRRP

vrrp *group* **track** *interface-type number* *interface –priority*	
no vrrp *group* **track** *interface-type number*	

&

46.3.8 VRRP IP

vrrp *group* **track** *ip-address* **interval** *interval-value* **timeout** *timeout-value* **retry** *retry-value* *priority*	
no vrrp *group* **track** *ip-address*	

e

46.3.9 VRRP

vrrp *group* **timers learn**	
no vrrp *group* **timers learn**	

&

46.3.10 VRRP

vrrp *group* **description**

text

46.4.1 show vrrp

show vrrp

show vrrp brief *group*	
show vrrp interface *type number* **brief**	

show vrrp

```
Ruijie# show vrrp
GigabitEthernet 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
GigabitEthernet 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
```

46.4.2 debug vrrp

debug vrrp

debug vrrp errors	
no debug vrrp errors	
debug vrrp events	
no debug vrrp events	
debug vrrp packets	
no debug vrrp packets	
debug vrrp state	
no debug vrrp state	
debug vrrp	
no debug vrrp	

debug 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: GigabitEthernet 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: GigabitEthernet 0/0 Grp 1 state Backup -> Master
Ruijie#
debug vrrp                    debug vrrp errors  debug vrrp events
debug vrrp packets        debug vrrp state
```

debug vrrp errors

```
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
```

debug vrrp events

```
Ruijie# debug vrrp events
Ruijie#
VRRP: Grp 1 Event - Advert higher or equal priority
VRRP: Grp 1 Event - Advert higher or equal priority
VRRP: Grp 1 Event - Advert higher or equal priority
Ruijie#
```

debug vrrp packets

```
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
```

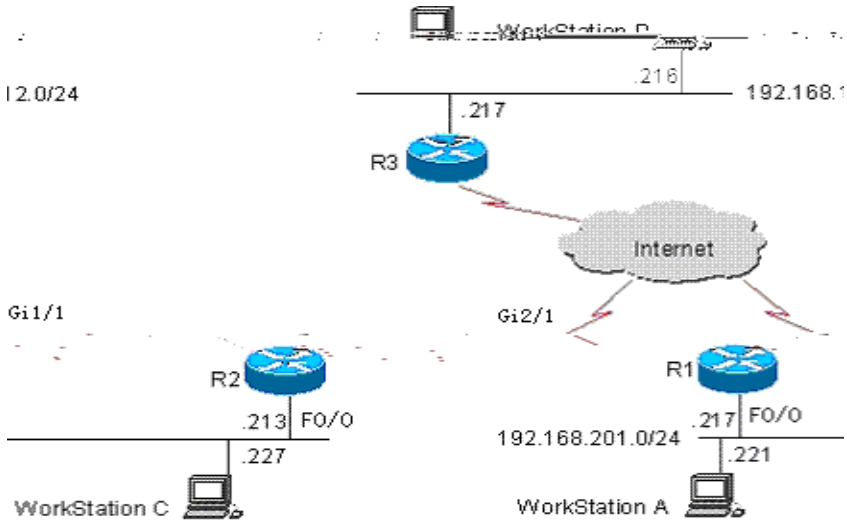
```
Ruijie# debug vrrp packets
Ruijie#
VRRP: Grp 1 Advertisement priority 120, ipaddr 192.168.201.213
VRRP: Grp 1 Advertisement priority 120, ipaddr 192.168.201.213
VRRP: Grp 1 Advertisement priority 120, ipaddr 192.168.201.213
```

debug vrrp state

```
Ruijie# debug vrrp state
VRRP State debugging is on
Ruijie#
%VRRP-6-STATECHANGE: GigabitEthernet 0/0 Grp 2 state Master -> Backup
```

```
%VRRP-6-STATECHANGE: GigabitEthernet 0/0 Grp 2 state Backup -> Master
Ruijie# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)# interface GigabitEthernet 0/0
Ruijie(config-if)# no shutdown
Ruijie(config-if)# end
Ruijie#
%VRRP-6-STATECHANGE: GigabitEthernet 0/0 Grp 2 state Master -> Init
Ruijie#
```

46.5 VRRP



4 VRRP

```
!
!
hostname "R3"
!
!
!
interface GigabitEthernet 0/0
```

```
no switchport
ip address 192.168.12.217 255.255.255.0
!
interface GigabitEthernet 1/1
no switchport
ip address 60.154.101.5 255.255.255.0
!
interface GigabitEthernet 2/1
no switchport
ip address 202.101.90.61 255.255.255.0
!
router ospf
network 202.101.90.0 0.0.0.255 area 10
network 192.168.12.0 0.0.0.255 area 10
network 60.154.101.0 0.0.0.255 area 10
!
!
!
end
```

46.5.1 VRRP

```
!
!
hostname "R1"
!
!
interface GigabitEthernet 0/0
no switchport
ip address 192.168.201.217 255.255.255.0
vrrp 1 priority 120
vrrp 1 timers advertise 3
```

```
vrrp 1 ip 192.168.201.1
!
interface GigabitEthernet 2/1
no switchport
ip address 202.101.90.63 255.255.255.0
!
router ospf
network 202.101.90.0 0.0.0.255 area 10
```

```
!
!
hostname "R1"
!
!
interface GigabitEthernet 0/0
no switchport
ip address 192.168.201.217 255.255.255.0
vrrp 1 priority 120
vrrp 1 timers advertise 3
vrrp 1 ip 192.168.201.1
vrrp 1 track GigabitEthernet 2/1 30
!

interface GigabitEthernet 2/1
no switchport
ip address 202.101.90.63 255.255.255.0
!
router ospf
network 202.101.90.0 0.0.0.255 area 10
network 192.168.201.0 0.0.0.255 area 10
!
!
end


!
!
hostname "R2"
```

```
!
interface GigabitEthernet 0/0
no switchport
ip address 192.168.201.213 255.255.255.0
vrrp 1 ip 192.168.201.1
vrrp 1 timers advertise 3
!
interface GigabitEthernet 1/1
no switchport
ip address 60.154.101.3 255.255.255.0
!
router ospf
network 60.154.101.0 0.0.0.255 area 10
```

```
!
!
hostname "R1"
!
interface GigabitEthernet 0/0
no switchport
ip address 192.168.201.217 255.255.255.0
vrrp 1 timers advertise 3
vrrp 1 ip 192.168.201.1
vrrp 2 priority 120
vrrp 2 timers advertise 3
vrrp 2 ip 192.168.201.2
vrrp 2 track GigabitEthernet 2/1 30
!
interface GigabitEthernet 2/1
no switchport
ip address 202.101.90.63 255.255.255.0
!
router ospf
network 202.101.90.0 0.0.0.255 area 10
network 192.168.201.0 0.0.0.255 area 10
!
!
end


!
!
hostname "R2"
!
!
interface Loopback 0
ip address 20.20.20.5 255.255.255.0
!
interface GigabitEthernet 0/0
no switchport
ip address 192.168.201.213 255.255.255.0
vrrp 1 ip 192.168.201.1
vrrp 1 timers advertise 3
vrrp 1 priority 120
vrrp 2 ip 192.168.201.2
vrrp 2 timers advertise 3
```

```
!
interface GigabitEthernet 1/1
no switchport
ip address 60.154.101.3 255.255.255.0
!
router ospf
network 60.154.101.0 0.0.0.255 area 10
network 192.168.201.0 0.0.0.255 area 10
!
!
!
end
```

46.6 VRRP

- **show vrrp**

د

د

47

47.1

47.1.1

，

，

47.1.2 CPU

show cpu

show 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
  2     0%     0%     0%    ktimer
  3     0%     0%     0%    atimer
  4     0%     0%     0%    printk_task
  5     0%     0%     0%    waitqueue_process
  6     0%     0%     0%    tasklet_task
  7     0%     0%     0%    kevents
  8     0%     0%     0%    snmpd
  9     0%     0%     0%    snmp_trapd
 10     0%     0%     0%    mtdblock
```

11	0%	0%	0%	gc_task
12	0%	0%	0%	Context
13	0%	0%	0%	kswapd
14	0%	0%	0%	bdflush
15	0%	0%	0%	kupdate
16	0%	3%	1%	ll_mt
17	0%	0%	0%	ll main process
18	0%	0%	0%	bridge_relay
19	0%	0%	0%	d1x_task
20	0%	0%	0%	secu_policy_task
21	0%	0%	0%	dhcpa_task
22	0%	0%	0%	dhcpsnp_task
23	0%	0%	0%	igmp_snp
24	0%	0%	0%	mstp_event
25	0%	0%	0%	GVRP_EVENT
26	0%	0%	0%	rldp_task
27	0%	2%	1%	rerp_task
28	0%	0%	0%	reup_event_handler
29	0%	0%	0%	tpp_task
30	0%	0%	0%	ip6timer
31	0%	0%	0%	rtadvd
32	0%	0%	0%	tnet6
33	2%	0%	0%	tnet
34	0%	0%	0%	Tarptime
35	0%	0%	0%	gra_arp
36	0%	0%	0%	Ttcptimer
37	8%	1%	0%	ef_res
38	0%	0%	0%	ef_rcv_msg
39	0%	0%	0%	ef_inconsistent_daemon
40	0%	0%	0%	ip6_tunnel_rcv_pkt
41	0%	0%	0%	res6t
42	0%	0%	0%	tunrt6
43	0%	0%	0%	ef6_rcv_msg
44	0%	0%	0%	ef6_inconsistent_daemon
45	0%	0%	0%	imid
46	0%	0%	0%	nsmd
47	0%	0%	0%	ripd
48	0%	0%	0%	ripngd
49	0%	0%	0%	ospfd
50	0%	0%	0%	ospf6d
51	0%	0%	0%	bgpd
52	0%	0%	0%	pimd

53	0%	0%	0%	pim6d
54	0%	0%	0%	pdmd
55	0%	0%	0%	dvmrpd
56	0%	0%	0%	vty_connect
57	0%	0%	0%	aaa_task
58	0%	0%	0%	Tlogtrap
59	0%	0%	0%	dhcp6c
60	0%	0%	0%	sntp_recv_task
61	0%	0%	0%	ntp_task
62	0%	0%	0%	sla_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_recv
69	0%	0%	0%	co_oper
70	0%	0%	0%	co_mac
71	0%	0%	0%	radius_task
72	0%	0%	0%	tac+_acct_task
73	0%	0%	0%	tac+_task
74	0%	0%	0%	dhcpd_task
75	0%	0%	0%	dhcps_task
76	0%	0%	0%	dhcpping_task
77	0%	0%	0%	dhcpc_task
78	0%	0%	0%	uart_debug_file_task
79	0%	0%	0%	ssp_init_task
80	0%	0%	0%	rl_listen
81	0%	0%	0%	ikl_msg_operate_thread
82	0%	0%	0%	bcmDPC
83	0%	0%	0%	bcmL2X.0
84	3%	3%	3%	bcmL2X.0
85	0%	0%	0%	bcmCNTR.0
86	0%	0%	0%	bcmTX
87	0%	0%	0%	bcmXGS3AsyncTX
88	0%	2%	1%	bcmLINK.0
89	0%	0%	0%	bcmRX
90	0%	0%	0%	mngpkt_rcv_thread
91	0%	0%	0%	mngpkt_recycle_thread
92	0%	0%	0%	stack_task
93	0%	0%	0%	stack_disc_task
94	0%	0%	0%	redun_sync_task

```
 95     0%     0%     0%    conf_dispatch_task
 96     0%     0%     0%    devprob_task
 97     0%     0%     0%    rdp_snd_thread
 98     0%     0%     0%    rdp_rcv_thread
 99     0%     0%     0%    rdp_slot_change_thread
100     4%     2%     1%    datapkt_rcv_thread
```

```
Ruijie# configure terminal                  //
Ruijie(config)# cpu-log log-limit 70 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%


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!
```

48

48.1

48.1.1

48.1.2

%SYS-1-TEMP_STATE: System detected temperature is in warning condition.

%SYS-1-TEMP_STATE: System detected temperature is in alert condition.

%SYS-1-TEMP_STATE: System detected temperature is in normal condition.

48.2

48.3

Â
Â
Â

48.3.1 CPU

Step 1	**configure terminal**	
Step 2	**threshold set cpu** **[M1 | M2 | slot** *n* | **member** *n***]** *warning_value critical_value*	

no threshold set cpu

48.3.2

Step 1	**configure terminal**	

Step 2	**threshold set memory [M1 | M2 | slot** *n* **| member** *n***]** *warning_value critical_value*	

no threshold set memory

48.3.3

show threshold cpu	
show threshold memory	

&	

48.4

```
Member 1:        90          100
Ruijie#show threshold temperature
Device       Warning     Critical
Member 1:        60           80
```

49

49.1

49.1.1

，

，

，

49.1.2

show memory

show memory	

show memory

```
Ruijie#show memory
System Memory Statistic:
  Free pages: 1079
    watermarks : min    , lower 758, low 1137, high 1516
  System Total Memory : 128MB, Current Free Memory : 5283KB
  Used Rate : 96%
```


	memory-lack exit-policy
	OVERFLOW
	OVERFLOW

49.1.3

memory-lack exit-policy

-lack exit-policy bgp ospf pim-sm rip]

memory-lack exit-policy bgp ospf pim-sm rip]	

no memory-lack exit-policy

( )

BGP

BGP

49.1.4

show memory protocol

show memory protocols	

show memory protocols

```
Ruijie# show memory protocols
=================================================
protocol      |memory(byte)
BGP            102000000
OSPF            24000000
RIP             10000000
PIM             50000000
LDP             20000000
Total           206000000
```

50 USB

50.1

50.2

50.2.1

50.2.2

makefs dev *dev_file* **fs** *fs_name*	*dev_file* *fs_name*

```
Ruijie# makefs dev /dev/uba/disc0/part1 fs vfat
```

50.2.3 USB

show usb	

show usb

```
Ruijie# sh usb
Device: USB Mass Storage Device :
ID: 778
Lun 0:
ID: 0
Disk Partitions:
1: /dev/uba/disc0/part1 --> /mnt/uba
size : 131072000B(125MB)
```

50.2.4 USB

usb remove *Device_ID*	*Device_ID*

```
OK, now you can poll out the device 778.
0:1:1:38 Ruijie: %5:USB Device <USB Mass Storage Device> Removed!
```

50.3 USB

51 SD

51.1 SD

51.1.1 SD

51.1.2

51.1.3

51.1.4 sd

show sd	

show sd

```
Ruijie#show sd

Product name: SD

Product serial number: d72185e3

    Disk Partitions:

    1: /dev/sd0/disc0/part1 --> /mnt/sd0

    size 1017643008B(970MB).

            SD
```

/dev/sd0/disc0/part1 /mnt/sd0 size : 1017643008B(970MB)

51.1.5

makefs dev *dev_file* **fs** *fs_name*

Now, you can drag out the sd card.

51.2 SD

show sd	

```
Ruijie#show sd
Product name: SD
Product serial number: d72185e3
    Disk Partitions:
    1: /dev/sd0/disc0/part1 --> /mnt/sd0
    size 1017643008B(970MB).
```

52

52.1

52.1.1

<priority> seq no: timestamp sysname
%ModuleName-severity-MNEMONIC: description

```
<189> 226:Mar  5 02:09:10 S3250 %SYS-5-CONFIG_I: Configured from console by
console
```

52.2

52.2.1

52.2.3

service timestamps *message-type* **uptime** **datetime**	

no service timestamps
message-type

52.2.4

no service
sysname

service sysname	

52.2.5

no logging count	
logging count	

52.2.6

no service sequence-numbers	
service sequence-numbers	

Ⱪ ٧ Ỳ ▲ ầ ش ō R!˜nTBB!$eŽù% &à…)%

52.2.8

logging rate-limit *number*	
no logging rate-limit	

52.2.9

logging console *level*	
logging monitor *level*	
logging buffered *buffer-size level*	
logging file flash:*filename max-file-size level*	
logging trap *level*	

52.2.11

```
Ruijie(config)# service timestamps log datetime

Ruijie(config)# logging 192.168.200.2
Ruijie(config)# logging trap debugging

Ruijie(config)# end
```

53 RLOG

53.1

53.2

53.2.1

rlog server *server-ip* **vrf** *vrf-name* | **oob**	
no rlog server	

ip session log-on

53.2.2

53.2.4

show rlog	

53.2.5

nat-log enable	
no nat-log enable	
ip nat-log on	
no ip nat-log on	

53.3

show rlog-type	
show rlog-status	
Show nat-log [username *user_name***] [ip-protocol** *ip-protocol***] [source-ip** *source-ip***] [dst-ip** *dst-ip***] [src-port** *src-port***] [dst-port** *dst-port***] time-interval** *begin-year begin-mon begin-day begin-hour* **to** *end-year end-mon end-day end-hour*	

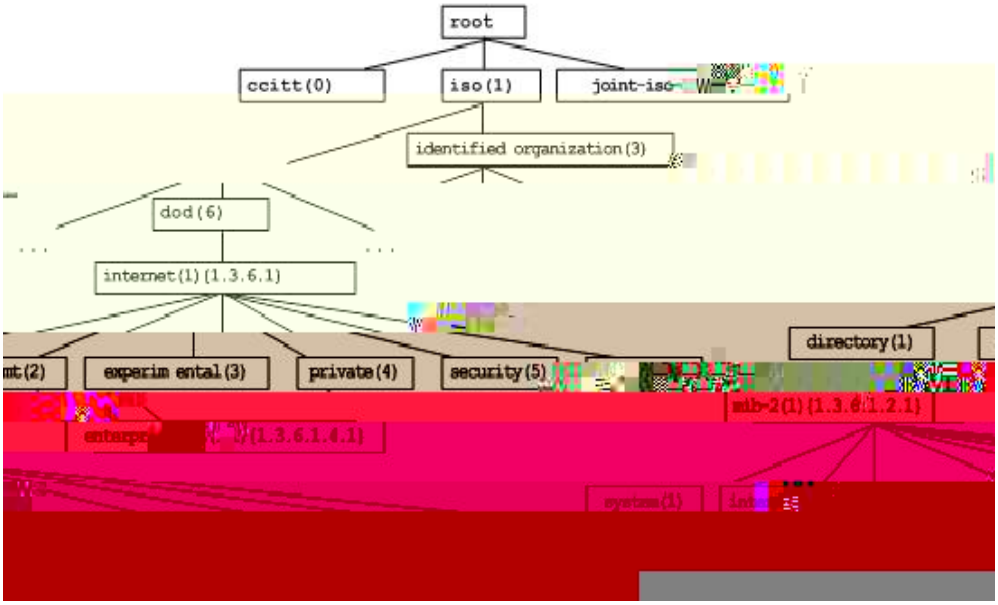
53.4

54 SNMP

54.1 SNMP

54.1.1

-
-



2 MIB

54.1.2 SNMP

54.1.3 SNMP

3 SNMP

54.1.4 SNMP

-
-

54.2 SNMP

54.2.1

，

，

，

snmp-server view *view-name oid-tree* **include exclude**	
snmp-server group *groupname* **v1 v2c v3 auth noauth priv read** *readview* **write** *writeview* **access** *num name*	

no snmp-server view *view-name* **no snmp-server view** *view-name oid-tree* **no snmp-server group** *groupname*

54.2.3 SNMP

snmp-server user *username roupname* **v1 v2 v3 encrypted auth md5 sha** *auth-password* **priv des56** *priv-password* **access** *num name*	

no snmp-server user *username groupname*

54.2.4 SNMP

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

54.2.5 SNMP

snmp-server contact *text*	
snmp-server location *text*	
snmp-server chassis-id *number*	

54.2.6 SNMP

snmp-server packetsize *byte-count*	

54.2.7 SNMP

no snmp-server	

54.2.8 SNMP

no enable service snmp-agent	

54.2.9 Agent NMS Trap

snmp-server enable traps *type option*	
no snmp-server enable traps *type option*	

54.2.10 Link Trap

interface *interface-id*	

54.3 SNMP

54.3.1 SNMP

show snmp

```
Ruijie# show snmp
Chassis: 1234567890 0987654321
Contact: wugb@i-net.com.cn
Location: fuzhou
2381 SNMP packets input
5 Bad SNMP version errors
6 Unknown community name
0 Illegal operation for community name supplied
0 Encoding errors
9325 Number of requested variables
0 Number of altered variables
31 Get-request PDUs
2339 Get-next PDUs
0 Set-request PDUs
2406 SNMP packets output
0 Too big errors (Maximum packet size 1500)
4 No such name errors
0 Bad values errors
0 General errors
2370 Get-response PDUs
36 SNMP trap PDUs
SNMP global trap: disabled
SNMP logging: enabled
SNMP agent: enabled
.
```



```
snmpInBadValues
snmpInReadOnlys
snmpInGenErrs
snmpInTotalReqVars
snmpInTotalSetVars
snmpInGetRequests
snmpInGetNexts
snmpInSetRequests
snmpInGetResponses
snmpInTraps
snmpOutTooBigs
snmpOutNoSuchNames
snmpOutBadValues
snmpOutGenErrs
snmpOutGetRequests
snmpOutGetNexts
snmpOutSetRequests
snmpOutGetResponses
snmpOutTraps
snmpEnableAuthenTraps
snmpSilentDrops
snmpProxyDrops
entPhysicalEntry
entPhysicalEntry.entPhysicalIndex
entPhysicalEntry.entPhysicalDescr
entPhysicalEntry.entPhysicalVendorType
entPhysicalEntry.entPhysicalContainedIn
entPhysicalEntry.entPhysicalClass
entPhysicalEntry.entPhysicalParentRelPos
entPhysicalEntry.entPhysicalName
entPhysicalEntry.entPhysicalHardwareRev
entPhysicalEntry.entPhysicalFirmwareRev
entPhysicalEntry.entPhysicalSoftwareRev
entPhysicalEntry.entPhysicalSerialNum
entPhysicalEntry.entPhysicalMfgName
entPhysicalEntry.entPhysicalModelName
entPhysicalEntry.entPhysicalAlias
entPhysicalEntry.entPhysicalAssetID
entPhysicalEntry.entPhysicalIsFRU
entPhysicalContainsEntry
entPhysicalContainsEntry.entPhysicalChildIndex
entLastChangeTime
```

54.3.3 SNMP

show snmp user

```
Ruijie# show snmp user

User name: test
Engine ID: 8000131103000000000000
storage-type: permanent    active
Security level: auth priv
Auth protocol: SHA
Priv protocol: DES
Group-name: g1
```

54.3.4 SNMP

show snmp group

```
Ruijie# show snmp group
groupname: g1
securityModel: v3
securityLevel:authPriv
readview: default
writeview: default
notifyview:
groupname: public
securityModel: v1
securityLevel:noAuthNoPriv
readview: default
writeview: default
notifyview:
groupname: public
securityModel: v2c
securityLevel:noAuthNoPriv
readview: default
writeview: default
notifyview:
```

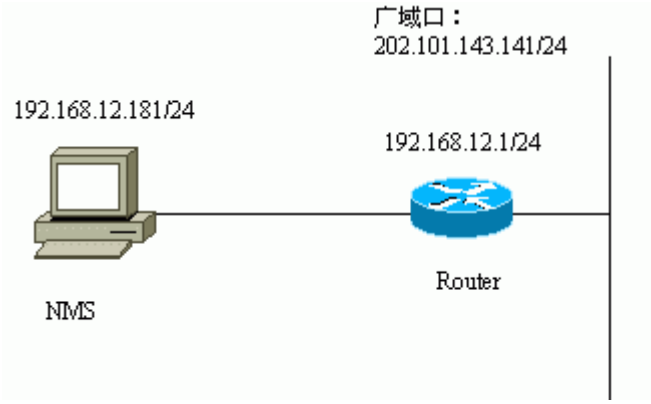
show snmp view

```
Ruijie# show snmp view
default(include) 1.3.6.1
test-view(include) 1.3.6.1.2.1
```

54.4 SNMP

54.4.1

，



5 SNMP

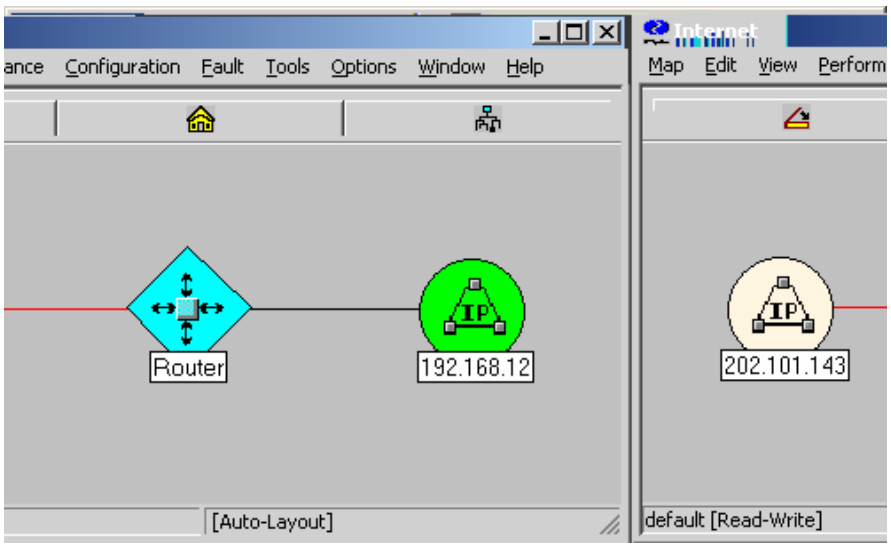
，

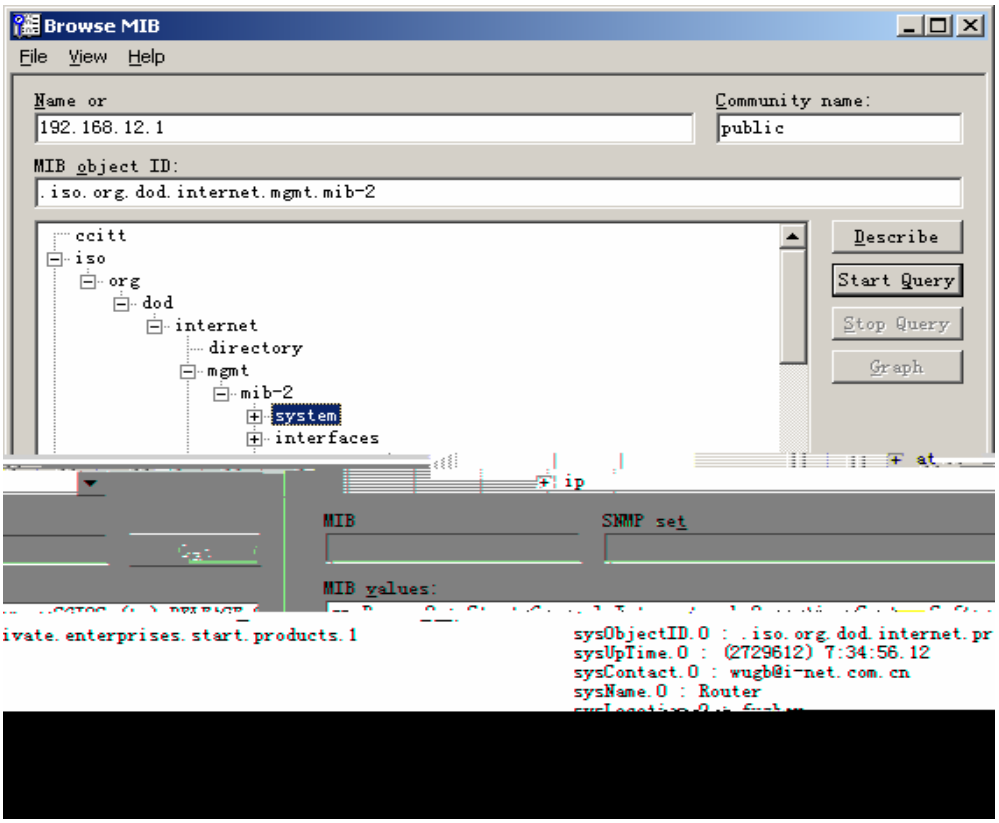
```
Ruijie(config)# snmp-server community public RO
```

```
Ruijie(config)# snmp-server community private RW
```

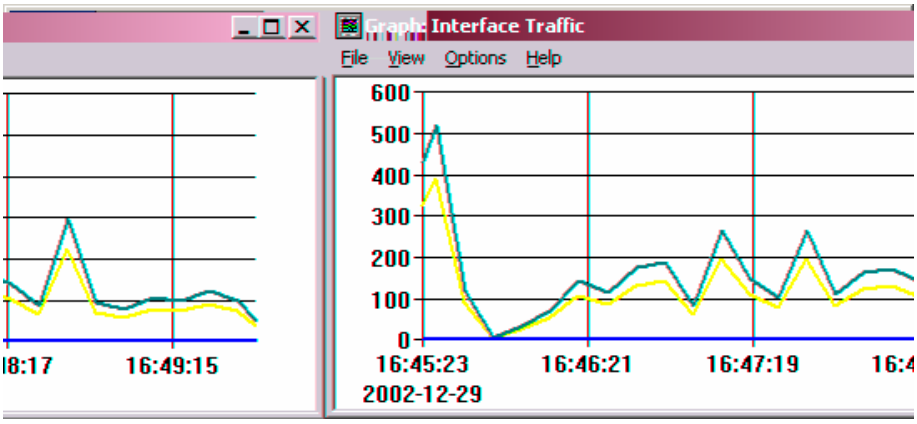
```
Ruijie(config)# snmp-server location fuzhou
Ruijie(config)# snmp-server contact wugb@i-net.com.cn
Ruijie(config)# snmp-server chassis-id 1234567890
```

```
Ruijie(config)# snmp-server enable traps
Ruijie(config)# snmp-server host 192.168.12.181 public
```





7 MIB



8

54.4.2 SNMP

```
Ruijie(config)# access-list 1 permit 192.168.12.181
Ruijie(config)# snmp-server community public RO 1
```

54.4.3 SNMPv3

```
Ruijie(config)# snmp-server view v3userview 1.3.6.1.2.1 include
Ruijie (config)# snmp-server group v3usergroup v3 priv read v3userview
write v3userview
```

55 MIB

55.1 MIB

、

、

、

、

、

、

、

、

、

、

show snmp mib

```
Ruijie# show snmp mib
sysDescr
sysObjectID
sysUpTime
sysContact
sysName
sysLocation
sysServices
sysORLastChange
```

```
ifNumber
ifEntry
ifEntry.ifIndex
ifEntry.ifDescr
ifEntry.ifType
ifEntry.ifMtu
ifEntry.ifSpeed
ifEntry.ifPhysAddress
ifEntry.ifAdminStatus
ifEntry.ifOperStatus
ifEntry.ifLastChange
ifEntry.ifInOctets
ifEntry.ifInUcastPkts
ifEntry.ifInNUcastPkts
ifEntry.ifInDiscards
ifEntry.ifInErrors
ifEntry.ifInUnknownProtos
ifEntry.ifOutOctets
ifEntry.ifOutUcastPkts
ifEntry.ifOutNUcastPkts
ifEntry.ifOutDiscards
ifEntry.ifOutErrors
ifEntry.ifOutQLen
ifEntry.ifSpecific
......
```

55.2 MIB

56 RMON

56.1

56.1.1

56.1.2

56.1.3

56.1.4

56.2 RMON

56.2.1

rmon collection stats *index* **owner** *ownername*	
no rmon collection stats *index*	

56.2.2

Bucket-number

56.2.3

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** *description-string*	
no rmon alarm *number*	
no rmon event *number*	

number

variable

interval

value

event-number

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

```
Ruijie# show rmon event
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
```

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

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



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
```

57 IPv6

57.1 IPv6

ɔ

ɔ

я ɞ

57.1.1 IPv6

v ŋ فھ

^ ~

د

د

د

د

د

د

د

د

^ ~

د

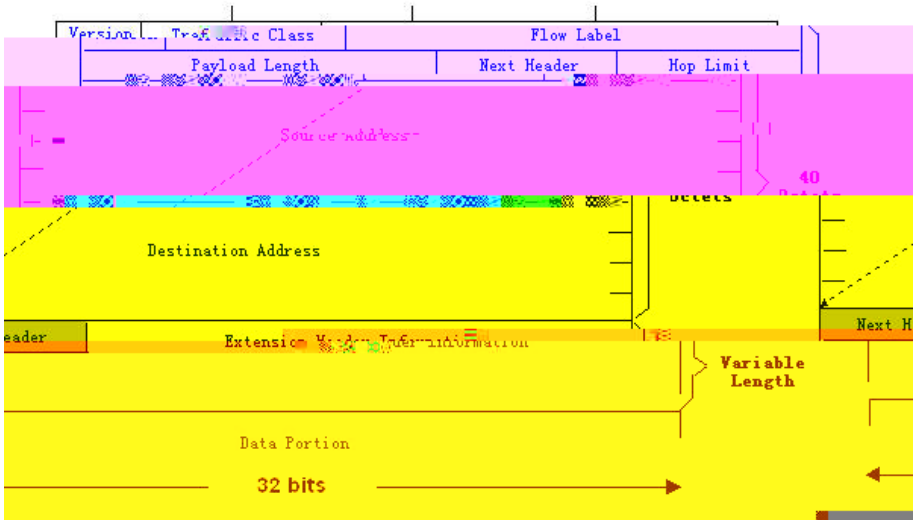
د

د


子网路由器的泛播地址格式
n比特
128-n 比特
子网前缀
0000..0000

2

57.1.3 IPv6


Flow Label
Payload Length
Next Header
Hop Limit
Destination Address
Variable Length
Data Portion
32 bits

3

-
-
-
-

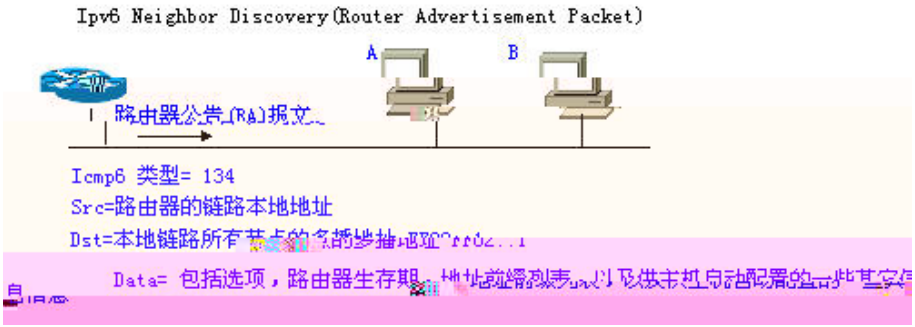
57.1.4 IPv6 MTU

57.1.5 IPv6

^ ~


Ipv6 Neighbor Discovery(Neighbor solicitation packet)
A
B
Icmp6 类型= 135
Src=A

Ω


Ipv6 Neighbor Discovery(Router Advertisement Packet)
A
B
Icmp6 类型= 134
Src=路由器的链路本地地址
Data= 包括选项，路由器生存期

5

、

、

、

、

、

no ipv6 nd suppress-ra

57.2 IPv6

57.2.1 IPv6

configure terminal	

interface *interface-id*	
ipv6 enable	
ipv6 address *ipv6-prefix/prefix-length* **eui-64**	**no ipv6 enable**
End	
show ipv6 interface vlan 1	
copy running-config startup-config	

no ipv6 address *ipv6-prefix/prefix-length* **eui-64**

```
Ruijie(config)# interface vlan 1
Ruijie(config-if)# ipv6 enable
Ruijie(config-if)# ipv6 address fec0:0:0:1::1/64
Ruijie(config-if)# end
Ruijie(config-if)# show ipv6 interface vlan 1
Interface vlan 1 is Up, ifindex: 2001
address(es):
Mac Address: 00:00:00:00:00:01
INET6: fe80::200:ff:fe00:1 , subnet is fe80::/64
INET6: fec0:0:0:1::1 , subnet is fec0:0:0:1::/64
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
```

57.2.2 ICMPv6

،

،

،

،

	، ،

```
Ruijie (config-if)# ipv6 redirects
Ruijie (config-if)# end
Ruijie # show ipv6 interface vlan 1
Interface vlan 1 is Up, ifindex: 2001
address(es):
Mac Address: 00:d0:f8:00:00:01
INET6: fe80::2d0:f8ff:fe00:1 , subnet is fe80::/64
INET6: fec0:0:0:1::1 , subnet is fec0:0:0:1::/64
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
```

57.2.3

no ipv6 neighbor

```
Ruijie(config)# ipv6 neighbor fec0:0:0:1::100 vlan 1
00d0.f811.1234
Ruijie (config)# end
Ruijie# show ipv6 neighbors verbose fec0:0:0:1::100
IPv6 Address       Linklayer Addr   Interface
fec0:0:0:1::100    00d0.f811.1234   vlan 1
State: REACH/H Age: - asked: 0
```

57.2.4

،

،

```
Ruijie# show ipv6 interface vlan 1
Interface vlan 1 is Up, ifindex: 2001
address(es):
Mac Address: 00:d0:f8:00:00:01
INET6: fe80::2d0:f8ff:fe00:1 , subnet is fe80::/64
INET6: fec0:0:0:1::1 , subnet is fec0:0:0:1::/64
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: 3
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
```

57.2.5

configure terminal	
interface *interface-id*	
ipv6 enable	
ipv6 nd ns-interval *milliseconds*	

ipv6 nd reachable-time *milliseconds*	
ipv6 nd prefix *ipv6-prefix/prefix-length* **default** *valid-lifetime preferred-lifetime* **at** *valid-date preferred-date* **infinite no-advertise**	
ipv6 nd ra-lifetime *seconds*	
ipv6 nd ra-interval *seconds*	

ipv6 nd managed-config-flag

show ipv6 interface *interface-id* **ra-info**	
show ipv6 neighbors verbose *interface-id ipv6-address*	
show ipv6 route static local connected	

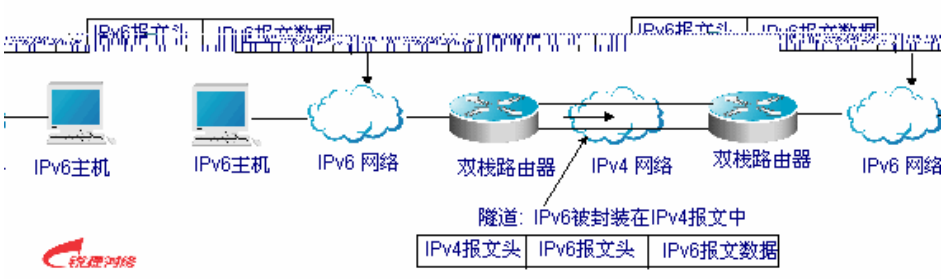
```
Ruijie# show ipv6 interface
interface vlan 1 is Down, ifindex: 2001
address(es):
Mac Address: 00:d0:f8:00:00:01
INET6: fe80::2d0:f8ff:fe00:1 , subnet is fe80::/64
INET6: fec0:1:1:1::1 , subnet is fec0:1:1:1::/64
Joined group address(es):
ff01:1::1
ff02:1::1
ff02:1::2
ff02:1::1:ff00:1
MTU is 1500 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
```

```
Ruijie# show ipv6 interface ra-info
vlan 1: DOWN
RA timer is stopped
waits: 0, initcount: 3
statistics: RA(out/in/inconsistent): 4/0/0, RS(input): 0
Link-layer address: 00:00:00:00:00:01
Physical MTU: 1500
```

```
ND router advertisements live for 1800 seconds
ND router advertisements are sent every 200 seconds<240--160>
Flags: !M!O, Adv MTU: 1500
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)


Ruijie# show ipv6 neighbors
IPv6 Address              Linklayer Addr  Interface
fe80::200:ff:fe00:1      0000.0000.0001 vlan 1
State: REACH/H Age: - asked: 0
fec0:1:1:1::1            0000.0000.0001 vlan 1
State: REACH/H Age: - asked: 0
```

58 IPv6

58.1



1

58.1.1 (IPv6 Manually Configured Tunnel)

،

،

58.1.3 ISATAP (ISATAP Tunnel)

“

```
config terminal
interface tunnel tunnel-num
tunnel mode ipv6ip
ipv6 enable
tunnel source {ip-address | type num}
tunnel destination ip-address
end
```

configure terminal	
interface tunnel *tunnel-num*	
tunnel mode ipv6ip	
ipv6 enable	
tunnel source *ip-address type num*	
tunnel destination *ip-address*	
end	
copy running-config startup-config	

58.2.2 6to4

```
config terminal
interface tunnel tunnel-num
tunnel mode ipv6ip 6to4
ipv6 enable
tunnel source {ip-address | type num}
ipvouounnelu-nu
```

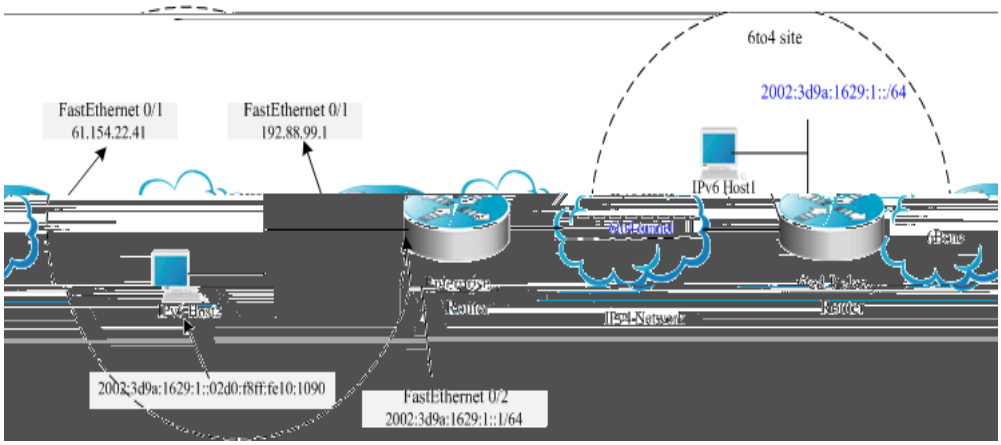
58.2.3 ISATAP

```
config terminal
interface tunnel tunnel-num
tunnel mode ipv6ip isatap
ipv6 address ipv6-prefix/prefix-length eui-64
tunnel source interface-type num
no ipv6 nd suppress-ra
end
```

configure terminal	
interface tunnel *tunnel-num*	
tunnel mode ipv6ip isatap	
ipv6 address *ipv6-prefix prefix-length* **eui-64**	
tunnel source type *num*	
no ipv6 nd suppress-ra	

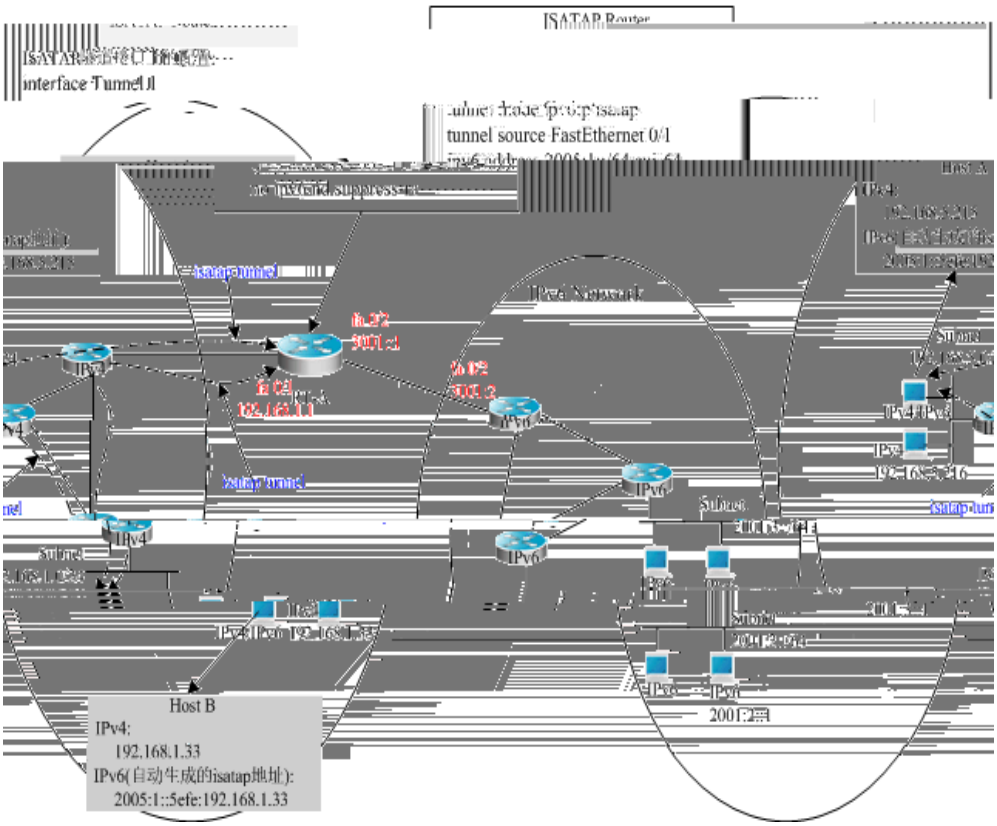
```
interface GigabitEthernet 2/1
no switchport
ip address 211.1.1.1 255.255.255.0


interface GigabitEthernet 2/2
no switchport
ipv6 address 2005::1/64
no ipv6 nd suppress-ra  (    )


interface Tunnel 1
tunnel mode ipv6ip
ipv6 enable
tunnel source GigabitEthernet 2/1
tunnel destination 192.1.1.1


ipv6 route 2001::/64 tunnel 1
```

58.4.2 6to4



```
ipv6 route 2002::/16 Tunnel 1
```

58.4.3 ISATAP



6

、

、

```
interface GigabitEthernet 0/1
no switchport
ip address 192.168.1.1 255.255.255.0


interface Tunnel 1
tunnel mode ipv6ip isatap
tunnel source GigabitEthernet 0/1
ipv6 address 2005:1::/64 eui-64
no ipv6 nd suppress-ra


interface GigabitEthernet  0/2
no switchport
ipv6 address 3001::1/64


ipv6 route 2001::/64 3001::2
```

58.4.4 ISATAP 6to4

&

6to4 relay router

```
interface GigabitEthernet 0/1
no switchport
ip address 211.162.1.1 255.255.255.0

interface GigabitEthernet  0/1
no switchport
ip address 192.168.0.1 255.255.255.0

interface Tunnel 1
tunnel mode ipv6ip isatap
tunnel source GigabitEthernet 0/1
ipv6 address 2002:d3a2:0101:1::/64 eui-64
no ipv6 nd suppress-ra

interface GigabitEthernet 0/2
no switchport
2002:d3a2:0101:10::1/64

interface GigabitEthernet  0/2
```

```
no switchport
2002:d3a2:0101:20::1/64


interface Tunnel 2
tunnel mode ipv6ip 6to4
ipv6 enable
tunnel source GigabitEthernet 0/1


ipv6 route 2002::/16 Tunnel 2


ipv6 route ::/0 2002:d3a2::0901::1



interface GigabitEthernet 0/1
no switchport
ip address 211.162.5.1 255.255.255.0


interface GigabitEthernet  0/1
no switchport
ip address 192.168.10.1 255.255.255.0


interface GigabitEthernet  0/2
no switchport
ip address 192.168.20.1 255.255.255.0


interface Tunnel 1
tunnel mode ipv6ip isatap
tunnel source GigabitEthernet 0/1
ipv6 address 2002:d3a2:0501:1::/64 eui-64
no ipv6 nd suppress-ra


interface Tunnel 2
tunnel mode ipv6ip 6to4
ipv6 enable
tunnel source GigabitEthernet 0/1


ipv6 route 2002::/16 Tunnel 2
```

```
ipv6 route ::/0 2002:d3a2::0901::1



interface GigabitEthernet 0/1
no switchport
ip address 211.162.7.1 255.255.255.0


interface GigabitEthernet 0/1
no switchport
ip address 192.168.0.1 255.255.255.0


interface Tunnel 1
tunnel mode ipv6ip isatap
tunnel source GigabitEthernet 0/1
ipv6 address 2002:d3a2:0701:1::/64 eui-64
no ipv6 nd suppress-ra


interface GigabitEthernet 0/2
no switchport
2002:d3a2:0701:10::1/64


interface Tunnel 2
tunnel mode ipv6ip 6to4
ipv6 enable
tunnel source GigabitEthernet 0/1


ipv6 route 2002::/16 Tunnel 2


ipv6 route ::/0 2002:d3a2::0901::1



interface GigabitEthernet 0/1
no switchport
ip address 211.162.9.1 255.255.255.0


interface GigabitEthernet 0/1
```