



RGOS 10.3 (4b11)p5

http://www.ruijie.com.cn/

http://webchat.ruijie.com.cn

http://www.ruijie.com.cn/service.aspx

7 24

1)

[ ] [ ]

{ x | y | … }

[x | y | …]

1.

2.

3.

4.

5. HTTP

1

no **default**

CLI

CLI

CLI

1.1

User
EXEC

abbreviated-command-entry?	Ruijie# **di**? dir disable
abbreviated-command-entry<Tab>	Ruijie# **show conf<Tab>** Ruijie# **show configuration**
?	Ruijie# **show ?**
command keyword ?	Ruijie(config)# **snmp-server community ?**

```
% Ambiguous command:
"show c"
```

	Ctrl-B	
	Ctrl-F	
	Ctrl-A	
	Ctrl-E	
	Backspace	
	Delete	
	Return Space	

1.8 CLI

1.8.1 Show

show

Ruijie# **show** *any-command* **|**

"ip route 0.0.0.0 0.0.0.0 192.1.1.1"

alias ?

*

EXEC ‖s‖ ‖show‖ ‖s?‖ ‘s‘

EXEC

‖sv‖ ‖show version‖

‖ia‖ ‖ip address‖

‖**ip address**‖

show aliases

1.9.1 CLI

CLI PC

CLI Console

Outband Telnet

2

2.1

CLI

2.1.1

2.1.1.4.2

reload 1 1 **test**

1

reload

1

2.1.1.5 line

lock

Step 1	Ruijie(config-line)# **lockable**	**line**
Step 2	Ruijie# **lock**	**line**

2.1.2

2.1.2.1

AAA

RADIUS

RADIUS

RADIUS

web ePortal

ePortal

2.1.2.2

AAA

AAA

web

Step 1	Ruijie(config)# **username** *name* [**web-auth**] [**pwd-modify 0|1**] [**password** *password*	**password**	

csv txt csv excel csv
excel

Txt :

```
aaa,aaa
bbb,bbb
ccc,ccc
```

web	CLI	CLI

Step 1 Ruijie#

2.1.3

2.1.3.1

( ) ( )

2.1.3.2

Step 1

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

2003-6-20 10:10:12

2.1.3.3

show clock

2.1.3.4

calendar

clock update-calendar

Step

	at 31 ,

2.1.4.2

2.1.4.5

Step 1	Ruijie# **reload cancel**	

2.1.5

2.1.5.1

(System Name)

CLI 32 32

Ruijie

2.1.5.2

Step 1	Ruijie(Config)# **hostname** *name*	32

no hostname

RGOS

RGOS

2.1.5.3

32 32

no prompt

2.1.6

2.1.6.1

banner

2.1.6.2

Step 1	(message of the day) c ('&') Ruijie(config)# **banner motd** *c message c* 255

no banner motd

(#) —Notice: system will shutdown on July 6th.‖

2.1.6.3

Step 1 *c*

Ruijie(config)# **banner login** *c message c*

Step 1	Ruijie# **show version**	

	show version
SYSTEMUPTIME	DD:HH:MM:SS

	Boot/Ctrl
flash	

2.1.7.3

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

2.1.8

2.1.8.1

Console

2.1.8.2

Step 1	Ruijie(config-line)# **speed** *speed*	bps 9600 19200 38400 57600 115200 9600

57600 bps

2.1.9 telnet

2.1.9.1

Telnet TCP/IP
Telnet Client
Telnet Client
Telnet A telnet B

2.1.9.2 Telnet Client

telnet

Step 1	Ruijie# **telnet** *host* [*port*] [**/source** {**ip** *A.B.C.D* **| interface** *interface-name*}] [**/vrf** *vrf-name*]	telnet IPV4 IPV4 Telnet Telnet

Telnet

IP 192.168.65.119

2.1.9.3 Telnet Server

Telnet Server

Step 1	Ruijie# **enable service telnet-server**	Telnet Server IPV4

2.1.10

2.1.10.1

2.1.10.2

LINE

LINE

- 20min

2.1.10.3

LINE

LINE

Step 1	Ruijie(config-line)# **session-timeout** *minutes* [**output**]	LINE *minutes* **output**

LINE **no exec-timeout** LINE

//

Ruijie# // LINE

// 20min

2.1.11

CLI

Step 1	Ruijie# **execute** {[**flash:**] *filename*}	

line_rcms_script.text **Telnet**

PC

Step 1	Ruijie(Config)# **ip http port** *number*	HTTP 80
Step 2	Ruijie(Config)# **ip http authentication** { **enable** | **local** }	web enable **enable** enable password enable secret 15 **local** username 15

no

Http Server 8080

HTTPS

Step 1	Ruijie(Config)# **ip http secure-port** *number*	HTTPS 443

no https

Https Server 4443

web

http https http https , http https http https http

3

3.1

Flash

Flash

3.2

3.2.1

4096

---

flash 128M

dir

flash flash 32M 512K

flash

USB flash USB
flash 512K
flash flash 512M 4M
flash
USB flash USB
flash 4M
flash 110%

10MB flash 10MB
flash 11MB

3.2.2

Ruijie# **cd** *directroy*	directory
Ruijie# **cd** *../*	
Ruijie# **cd** *./*	

MNT Document

MNT/Document

3.2.3

copy

Ruijie# **copy flash:** *filename* **flash:** *directoryname*	

Ruijie# **copy flash:**

3.2.4

Ruijie# **dir**	
Ruijie# **dir** *directory*	

3.2.5

Ruijie# **makefs dev** *devname* **fs** *fs_name*	*fs_name* **dev**

dev MTD JFFS2

JFFS2 MTDBLOCK

3.2.6

Ruijie# **mkdir** *directoryname*	

BAK

3.2.7

Ruijie# **rename flash:** *old_filename* **flash:** *new_filename*	*old_filename* *new_filename*

3.2.8

Ruijie# **pwd**	

3.2.9

Ruijie# **rm** [**recursive**] *filename*	
Ruijie# **delete** [**recursive**] *filename*	

MNT large.c

aaa

3.2.10

Red-Giant# **rmdir** *directoryname*	

MNT

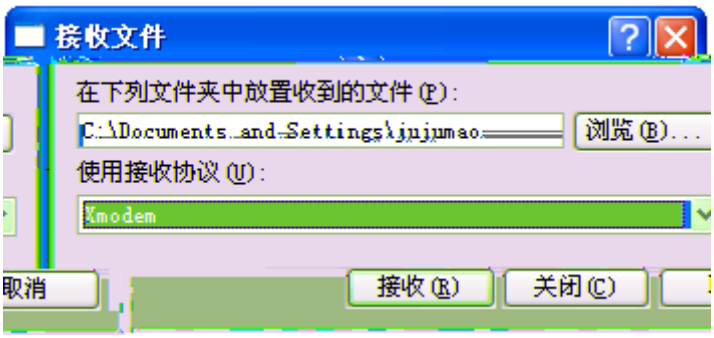
CLI

Windows

Windows — ‖ — ‖

–Xmodem‖ — ‖

— ‖



Ruijie# **copy flash**:*filename* **xmodem**	*filename*

copy xmodem flash:‖filename‖ **copy flash:**‖filename‖ **xmodem**

4.2.3

tftp xmodem

1

2

show version

redundancy force-switchover

1 **rgos.bin**

2 **copy**

3

1

2

3

4

5

5 6 7

5 HTTP

5.1 HTTP

5.1.1 HTTP

HTTP HTTP HTTP

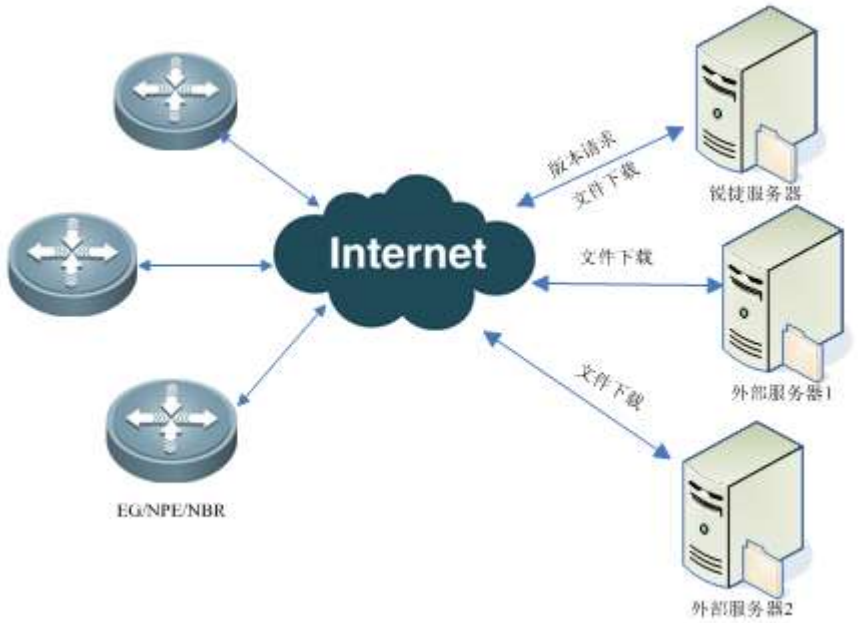
HTTP HTTP

HTTP HTTP WEB

5.1.2

HTTP

CLI



HTTP WEB

5.1.3

RFC1945 - Hypertext Transfer Protocol -- HTTP/1.0

RFC2616 - Hypertext Transfer Protocol -- HTTP/1.1

RFC1867 - Form-based File Upload in HTML

5.2

5.2.1

5.2.2

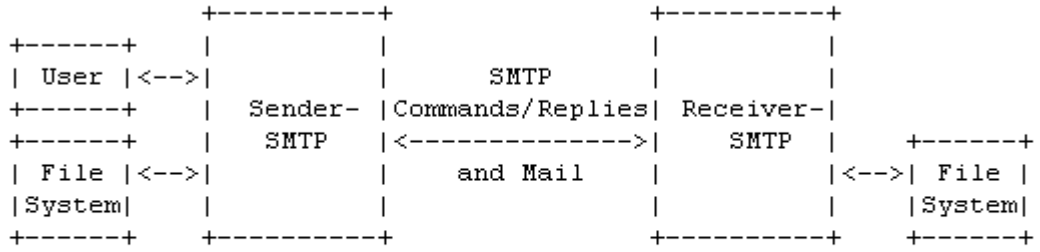
HTTP

1

2 HTTP

SMTP

SMTP



Sender-SMTP Receiver-SMTP

Model for SMTP Use

Sender-SMTP
Receiver-SMTP

Foxmail Outlook User File System
Sender-SMTP

HTTP

HTTP HTTP POST FORM

5.2.3

RFC1945 - Hypertext Transfer Protocol -- HTTP/1.0

RFC2616 - Hypertext Transfer Protocol -- HTTP/1.1

RFC1867 - Form-based File Upload in HTML

RFC821 - Simple Mail Transfer Protocol -- SMTP

RFC822 – Standard for the format of arpa internet text messages -- MIME

5.3

HTTP

	0.0.0.0
	80

5.4 HTTP

5.4.1

HTTP

Step 1	Ruijie# **http check-version**	
Step 2	Ruijie# **http update** { **all** | *string*}	

HTTP

5.4.2

HTTP 0.0.0.0 80

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **http update server** *host* [**port** *port-value*]	
Step 3	Ruijie# **show running**	

#

5.5

5.5.1

HTTP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **http update set oob**	
Step 3	Ruijie# **show running**	

no http update set oob

HTTP

5.5.2

HTTP

no http update mode

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **http update mode { auto-update | auto-detect | manual }**	

3 HTTP

5.5.4

HTTP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **http update set oob**	
Step 3	Ruijie# **show running**	

no http update set oob

HTTP

5.6

5.6.1

Step 1	Ruijie#

5.6.5

Step 1	Ruijie# **show feedback items**	
Step 2	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **feedback ignore-item** *number*	
Step 3	Ruijie(config)# **end**	
Step 4	Ruijie# **show running**	

#

5.6.6

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **feedback frequency** *minute*	
Step 3	Ruijie(config)# **end**	

Step 4	Ruijie# **show running**	

5

feedback frequency

end

show run

5.7

SMTP

5.7.1

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **no mail-service enable**	
Step 3	Ruijie(config)# **end**	
Step 4	Ruijie# **show running**	

mail-service enable

#

5.7.2 SMTP

SMTP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **mail-client smtp-server** *host* [**port** *value*]	SMTP

1.
2.
3.
4.
5.
6. LINE
7.
8.
9. VLAN-TERMINAL

1

1.1

Ruijie

Dialer NULL Loopback

Ruijie

	GigabitEthernet tenGigabitEthernet	IEEE802.3 RFC894
Dialer	dialer	—
Loopback	Loopback	—
NULL	NULL	—
	GigabitEthernet 0/0.10( )	—

1.2

1.2.1

Ruijie(config)#

1.2.2 IP

NULL IP

Ruijie(config-if)# **ip address** *ip-address ip-mask*	
Ruijie(config-if)# **no ip address**	

IP IP

1.2.3

Ruijie(config-if)# **description** *interface-description*	80
Ruijie(config-if)# **no description**	

1.2.4 MTU

MTU IP 64 6553

1.3

1.3.1

Ruijie# **show interface** [*interface-type interface-number*]	

1.3.2

Ruijie# **clear counters** [*interface-type interface-number*]	**show interface** 0
Ruijie# **clear interface** [*interface-type interface-number*]	

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

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

1.3.3

shutdown **no shutdown**

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

1.4

1.4.1

1.4.2

gigabitEthernet 0/0

2

VLAN

2.1

2.1.1

IP

MTU

2.1.1.1

interface

Ruijie(config)#**interface** *interface-type interface-number*	interface interface range interface range macro

Gigabitethernet 0/1

2.1.1.2 interface range

2.1.1.2.1

interface range **interface range**

Ruijie(config)# **interface range** {*port-range* | **macro** *macro_name*}	**interface range** macro ,

interface range range

GigabitEthernet *slot/*{ *port*} - { *port*}

TenGigabitethernet *slot/*{ *port*} - { *port*} Â%#qRUÑ2ÑRUÑ2BP%XÂ2IAU%Xþ¿&&RUÑ

TenGigabitethernet

Ruijie (Config-if)# **ip address** *ip-address ip-mask* [**secondary**]	IP
Ruijie (Config-if)# **no ip address** *ip-address ip-mask* [**secondary**]	IP

IP Secondary IP IP

_ IP

2.1.1.4 MAC

MAC MAC

MAC

MAC

Ruijie (Config-if)# **mac-address** *mac-address*	MAC
Ruijie (Config-if)# **no mac-address**	MAC

MAC MAC

2.1.2

Ruijie(config-if)# **duplex** {**auto** | **full** | **half** }	speed,duplex, auto

no speed no duplex

Gigabitethernet 0/1 100M

IEEE Master Slave ..

2.1.5 MTU

jumbo

MTU

MTU

MTU MTU

MTU

MTU 64~1500 4 1500

SVI MTU

Ruijie(config-if)# **Mtu** *num*	MTU Num <64-1500>

Gigabitethernet 0/1 MTU

2.1.6

2.1.6.1

show

Ruijie# **show interfaces** [*interface-id*]	
Ruijie# **show interfaces** [*interface-id*] **description**	

2.1.6.2

Ruijie# **clear counters GigabitEthernet** *interface-number*	

2.1.7 LinkTrap

LinkTrap Link

SNMP LinkTrap,

2.1.7.1

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

2.1.7.2

Link trap:

no

802.1Q

4 802.1Q

Ruijie((config-subif))# **encapsulation dot1Q** *VlanID*	802.1Q VLAN ID VLANID VLANID

VLANID 1 4085

VLAN native

2.2.2.2 IP

VLAN VLAN IP
IP

Ruijie((config-subif))# **ip address** *ip-address mask*	IP

802.1Q IP VLAN VLAN

2.2.3 VLAN

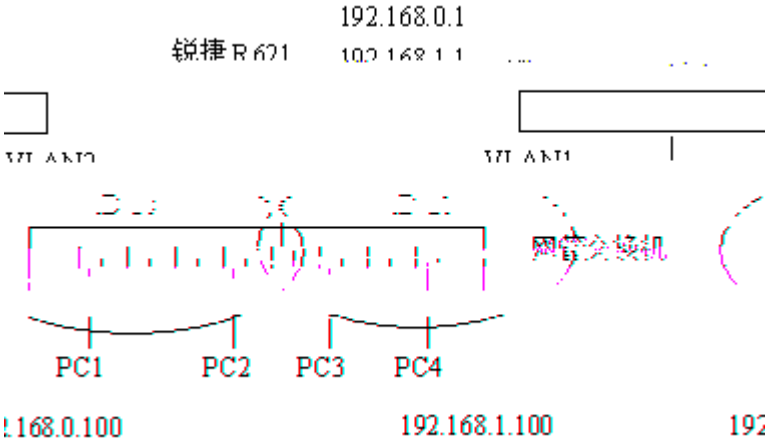
VLAN **show**

Ruijie# **show vlans** [*VlanID*]	VLAN
Ruijie# **clear vlan** [*VlanID*]	VLAN

2.2.4 VLAN

VLAN VLAN

1. VLAN 192.168.0.0/24 VLAN 192.168.1.0/24
2. 802.1Q VLAN



// 802.1Q VlANID 20
// IP

// 802.1Q VlANID 21
// IP

3

Loopback( ) NULL( )
Dialer( )

3.1 Loopback

Loopback( ) UP Loopback
Loopback IP
OSPF Telnet Telnet
Loopback

Ruijie(config)# **interface loopback** *loopback-interface-number*	loopback
Ruijie(config)# **no interface loopback** *loopback-interface-number*	loopback

interface loopback *loopback-interface-number* Loopback
Loopback (IP)

Loopback **no**
interface loopback *loopback-interface-number* Loopback
show interfaces loopback *loopback-interface-number* Loopback

Ruijie# **show interfaces loopback** *loopback-interface-number*	loopback

show interfaces loopback

Loopback IP
MTU Bandwidth

3.2 NULL

NULL( ) NULL( )
UP NULL
NULL NULL
help **exit**

NULL
NULL

NULL

Ruijie(config)# **interface null** *0*	NULL

NULL — **no interface null**
NULL

3.3

3.3.1

1)

3.3.2

3.3.2.1

4

4.1

4.1.1

EG

4.1.2

EG

4.1.2.1

1	
2	IP NAT
3	MGMT MGMT

4.1.2.2

forward forward

sniffer sniffer

bypass bypass

receive-only receive-only

	1 8 4 3 5 3 2

4.1.2.3

EG MGMT

	1

4.2

4.3

4.3.1

IP NAT

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **sys-mode gateway**	

receive-only **no lan-ip**

0 receive-only

192.168.0.0/255.255.255.0 10.10.10.0/255.255.255.0

EG EG1000L EG

4.3.3

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **specify interface** *interface-name* { *lan* | *wan*}	*interface-name* *lan* *wan:*
Step 3	Ruijie(config)# **end**	
Step 4	Ruijie# **show running**	

show sys-mode dialer

wan lan

1 GigabitEthernet 0/0

2 GigabitEthernet 0/0

3 GigabitEthernet 0/0

4.3.4

EG2000X EG2000XE EG2000UE 4 2 2

4 1 2

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **xaui-mode slot** *slot-num*	4 1 **slot** *slot-num*
Step 3	Ruijie(config)# **end**	
Step 4	Ruijie# **show running**	

EG2000X EG2000XE EG2000UE 8 2
4 1 show run xaui-mode slot 2
xaui-mode slot 3
8 2

3 EG2000X EG2000XE EG2000UE 4 1

4 EG2000X EG2000XE

EG2000X EG2000XE EG2000UE

4.3.5 bypass

EG1000S EG1000C EG2000D EG2000T EG2000CE EG2000SE EG2000P EG2000G EG2000GE EG2000X EG2000XE EG2

4.4

show bridge-map [*bridge-num*]	EG1000L

show bridge-map *bridge-num* **lan-ip**

5

5.1

5.1.1

EG

Console

MGMT Management

MGMT

5.1.2

MGMT

Console MGMT

ip ref	enable
duplex	auto
speed	auto
flowcontrol	enable

5.3 MGMT

MGMT IP

MGMT

5.3.1 MGMT IP

MGMT IP MGMT IP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)#**interface mgmt 0**	
Step 3	Ruijie(config-if-Mgmt 0)#**ip address** *ip-address subnet-mask*	IP

MGMT LAN

LAN

MGMT IP

5.3.2 MGMT

Step 1	Ruijie#**configure terminal**	
Step 2	Ruijie(config)#**interface mgmt 0**	
Step 3	Ruijie(config-if-Mgmt 0)#**gateway** *A.B.C.D*	
Step 4	Ruijie(config-if-Mgmt 0)# **mtu** *mtu-value*	MTU
Step 5	Ruijie(config-if-Mgmt 0)# **speed** {**10** | **100** | **1000** | **auto**}	speed auto
Step 6	Ruijie(config-if-Mgmt 0)# **duplex** { **full** | **half** | **auto** }	duplex auto
Step 7	Ruijie(config-if-Mgmt 0)# **flowcontrol**	enable
Step 8	Ruijie(config-if-Mgmt 0)# **description** *text*	
Step 9	Ruijie(config-if-Mgmt 0)#**shutdown**	MGMT

	mtu	**speed**	**duplex**	**flowcontrol**	**description**	**shutdown**

#

5.3.3

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

ping oob

6 LINE

6.1

LINE

LINE

/ LINE VTY

LINE

6.2 LINE

6.2.1 LINE

LINE LINE LINE
LINE

Ruijie(config)# **line** [**aux** | **console** | **tty** | **vty**] *first-line* [*last-line*]	LINE

6.2.2 / LINE VTY

LINE VTY 5 LINE VTY VTY
36

LINE VTY VTY
show users

VTY 7 telnet VTY 7

CLI no line vty 6 VTY VTY 7

Ruijie(config)# **line vty** *line-number*	LINE VTY

Ruijie(config)# **no line vty** *line-number*	LINE VTY

6.2.3 Line

LINE VTY

TTY

configure terminal	
Line vty *line number*	Line
transport input {**all** | **ssh** | **telnet** | **none**}	Line
no transport input	LINE
default transport input	LINE

6.2.4 Line

LINE Line

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

7

7.1

DLDP

DLDP

arp

mac

8

8.1 PPPOE

8.1.1 PPPOE

PPP(PPPOE PPP over Ethernet) DDR
DDR

PPPOE DDR(DDR Profiles)

8.1.2 PPPOE

PPPOE PPPOE

8.1.2.1

PPPOE

no shutdown

PPPOE

Ruijie(config-if)# **pppoe enable**	PPPOE

PPPOE DDR Profiles
DDR Profiles

Ruijie(config-if)# **pppoe-client dial-pool-number** *pool-number* **dial-on-demand**	(, pppoe)

8.1.2.3

PPPOE

PPPOE NAT

Ruijie(config)# **dialer-list** *number dialer-group* **protocol** *protocol-name* {**permit** | **deny** | **list** *access-list-number* | *access-group*}	

IP
PPPOE PPPOE

Ruijie(config)# **ip route** *0.0.0.0 0.0.0.0* **dialer** *dialer-number* [**permanent**]	permanent enable-timeout down

8.1.3 PPPOE

PPPOE, EXEC

Ruijie# **show pppoe** {**tunnel** | **session**}	tunnel

8.1.4 PPPOE

PPPOE

1. 5 5
2. pppoe pppoe
3. NAT 192.168.0.0/24

PPPOE, 10

#

#

// 10

//5

end

9 VLAN-TERMINAL

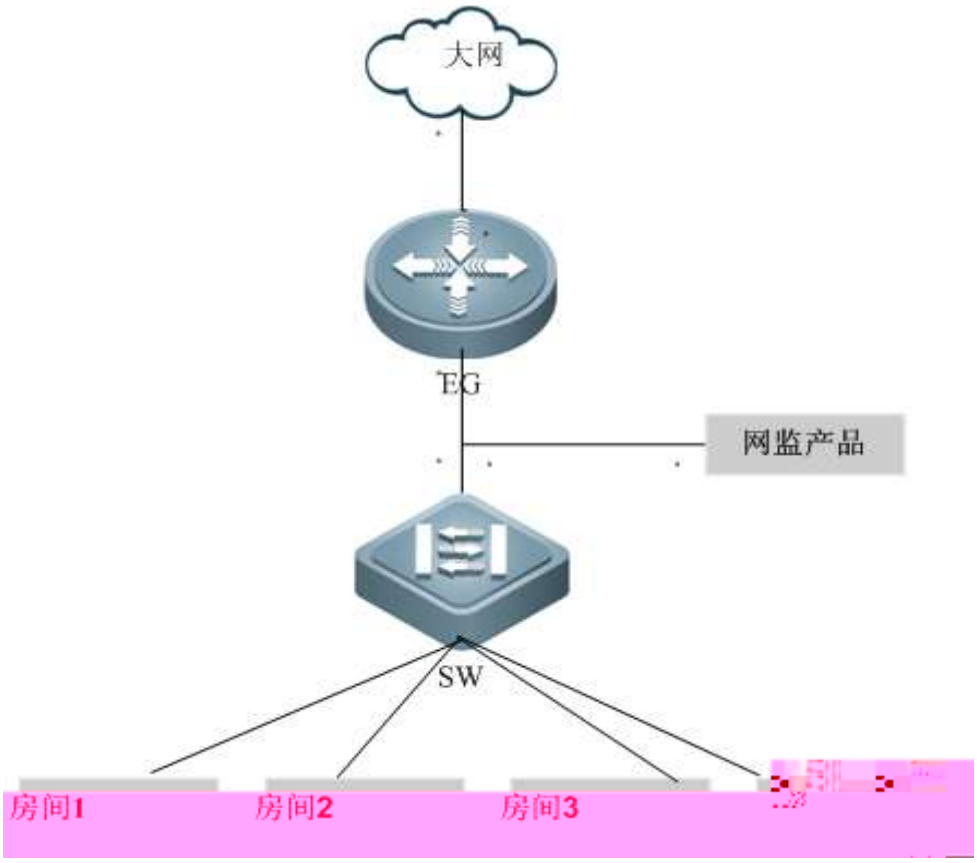
9.1 VLAN-TERMINAL

9.1.1 VLAN-TERMINAL

Vlan j8StujE2EjG} trunk

vlan

VID VID lan



EG

EG vlan terminal IP
IP vlan IP

9.1.2 VLAN-TERMINAL

VLAN-TERMINAL

9.3.1 vlan termina

vlan terminal vlan terminal

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **vlan-terminal enable**	vlan terminal
Step 3	Ruijie(config-if)#**end**	
Step 4	Ruijie# **show vlan-terminal**	

vlan-terminal **no vlan-terminal enable**

vlan terminal

Ruijie(config)#

D

VID

JETBT1 0 0 1 302.3 5Tm46.1m9 0 2imi

Gi0/1: 1, 2, 60-80

Gi0/2: 4, 100-20

9.5 VID

VID VID IP

Ruijie# **show vid-info**	VID VID IP

Ruijie# show vid-info

102 2 192.168.1.10,192.168.1.12

IP

IP

1. IP
2. IPv4
3.
4. NAT
5.

1 IP

1.1 IP

1.1.1 IP

IP 32
8 0~255 . 192.168.1.1
IP

IP IP 32 IP 1
2 IP

A

IP IP

IP

CNNIC IP

ICANN,Internet Corporation for Assigned Names and Numbers

IP

A	0.0.0.0	
	1.0.0.0~126.0.0.0	
	127.0.0.0	
B	128.0.0.0~191.254.0.0	
	191.255.0.0	
C	192.0.0.0	
	192.0.1.0~223.255.254.0	
	223.255.255.0	
D	224.0.0.0~239.255.255.255	
E	240.0.0.0~255.255.255.254	
	255.255.255.255	

IP

RFC 1918

	IP

IP

ARP

IP

IP

1.1.2.1 IP

IP IP IP
IP

IP

Ruijie(config-if)# **ip address** *ip-address mask*	IP
Ruijie(config-if)# **no ip address**	IP

32 IP
~~1~~ IP ~~0~~ IP
A ~~2~~55.0.0.0

IP

IP IP IP
IP IP

IP

Ruijie(config-if)# **ip address** *ip-address mask* **secondary**	IP
Ruijie(config-if)# **no ip address** *ip-address mask* **secondary**	IP

1.1.2.2 ARP

IP 1

MAC MAC

IP ë ˜rC@pÕ€

ARP IP ARP

ARP

Ruijie(config)# **arp** *ip-address mac-address arp-type*	ARP arp-type arpa
Ruijie(config)# **no arp** *ip-address*	ARP

1.1.2.2.2 ARP AnyIp

IP
ARP IP

1 IP IP IP

2 IP

IP ARP
ARP ( ) ARP

1 ARP MAC clear arp ARP

2 ARP MAC AnyIP
anyip

Ruijie(config)# **interface gi 0/0**	
Ruijie(config-if-GigabitEthernet 0/0)# **arp any-ip**	anyip
Ruijie(config-if-GigabitEthernet 0/0)# **no arp any-ip**	anyip

anyip

AnyIP ARP
ARP VRRP ARP AnyIP ARP
AnyIP

1.1.2.2.3 ARP

ARP Ethernet II ARPA

1.1.2.2.4 ARP

ARP IP MAC ARP
ARP
ARP

ARP

Ruijie(config-if)# **arp timeout** *seconds*	ARP 0-2147483 0
Ruijie(config-if)# **no arp timeout**	

3600 1

1.1.2.2.5 ARP

ARP ARP arp arp
ARP ARP
ARP ARP

Ruijie(config-if)# **arp trust-monitor enable**	arp
Ruijie(config-if)# **no arp trust-monitor enable**	

arp

Ruijie(config-if)# **no arp-learning enable**	arp

arp

1.1.2.2.7 ARP

ARP ARP
IP IP
UP UP IP

Ruijie(config-if)#**arp scan [***start-ip-address end-ip-address***]**	ARP

ARP

1 ARP IP
2 IP ARP
ARP
1024
3 ARP IP IP IP
IP 22
4 ARP IP IP IP IP IP

web ARP ARP

1.1.2.2.8 ARP

ARP > ü´0¡ðiŽë XPˆ ´0¡ðaõ ARP
ARP ARP ARP ARP ARP
ARP ARP ARP ARP
ARP ARP
ARP ARP ARP ARP
ARP ARP

Step 1 Ruijie(config)# **show arp trusted**

Ruijie(config)# **no ip routing**	IP
Ruijie(config)# **ip routing**	IP

ip checksum ip

1.1.2.4

1
1 2
32 1
IP IP

IP

IP

RFC 919 RFC 922

IP

1.1.2.4.1

IP IP IP 172.16.16B16B

IP

IP 1

1.1.3.2

IP

Ruijie# **show arp**	ARP
Ruijie# **show ip arp**	IP ARP
Ruijie# **show ip interface** [*interface-type interface-number*]	IP
Ruijie# **show ip route** [*network* [*mask*]]	
Ruijie#**show ip route**	
Ruijie# **ping** *ip-address* [**length** *bytes*] [**ntimes** *times*] [**timeout** *seconds*]	

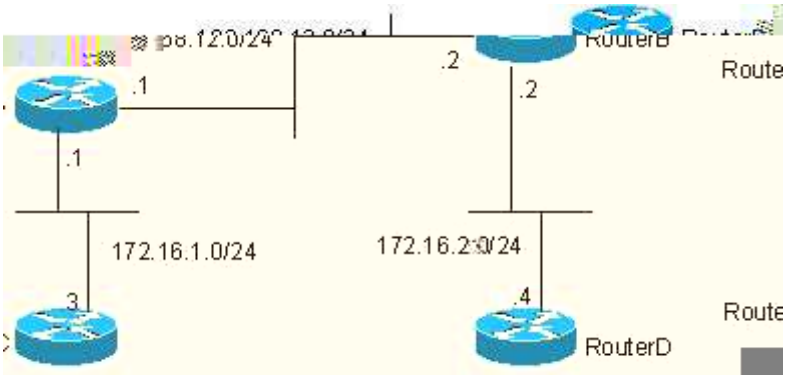
1.1.4 IP

IP

IP

1.1.4.1 IP

IP



IP

RIP RIPv1 C 172.16.2.0/24 D 172.16.1.0/24

RIPv1 172.16.1.0/24
172.16.2.0/24 C 192.168.12.0/24
C D RIP

A

ip default-gateway *ip-address*	

show ip redirects	

1.2.3 IP

IP IP ICMP
ICMP ICMP
RFC 792
IP
ICMP
ICMP
ICMP
IP MTU
IP

1.2.3.1 ICMP

IP
ICMP
ICMP
ICMP

Ruijie(config-if)# **ip unreachables**	ICMP
Ruijie(config-if)# **no ip unreachables**	ICMP

1.2.3.2 ICMP

ICMP

1.2.3.5 IP

IP IP IP
RFC 791
ICMP
IP

IP

Ruijie(config)# **ip source-route**	IP
Ruijie(config)# **no ip source-route**	IP

2 IPv4

2.1 IPv4

2.1.1 IPv4

(Prefix Tree+Adjacency) Ruijie Express Forwarding REF REF Cache CPU Cache CPU

REF

Prefix Tree

IP

Prefix Tree Radix Tree M-Tries Tree M-Tries Tree Prefix Tree Radix Tree Prefix

Adjacency

REF

1) REF

2) Prefix Tree

3)

2.2

EG

2.3

IP REF
IP/MASK
IP IP

1. IP IP IP
2. IP IP IP IP IP
3. IP IP IP
IP

Ruijie(config)# **ip ref load-sharing**
Original

Ruijie# **show ip ref packet-statistic** [**clear**]	/ REF

2.4.2

Ruijie# **show ip ref adjacency** [**glean** | **local** | *ip* | (**interface** *interface_type interface_number*) | **statistic**]	IP

2.4.3

IP IP IP
IP IP
CPU

Ruijie# **show ip ref exact-route** [**vrf** vrf_name] source-ipaddress dest_ipaddress	

2.4.4

Ruijie# **show ip ref route** [**vrf** *vrf_name*] [**default** | (*ip mask*) | **statistic]**	0

3.4

show ip fpm user

Ruijie# **show ip fpm users**	

3.5

ip session timeout

Ruijie# **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*	

3.6

icmp-closed	

tcp-fin-wait	60s
tcp-last-ack	30s
tcp-syn-receive	10s
tcp-syn-sent	10s
tcp-time-wait	10s
udp-closed	

3.6.3

TCP
tcp-closed tcp-close-wait tcp-fin-wait tcp-syn-sent tcp-time-wait

ip session timeout tcp-closed 5

ip session timeout tcp-close-wait 10

ip session timeout tcp-fin-wait 10

ip session timeout tcp-syn-sent 5

ip session timeout tcp-time-wait 5

UDP udp-connected udp-closed
udp-connected

ip session timeout udp-closed 5

ip session timeout udp-connected 600

NAT

Step 2 Ruijie(config)# **interface** *interface*

Ruijie(config)#**no ip nat translation**

NAT

4.1.6.3 NAPT

NAPT NAT
NAPT

WEB 192.168.12.3 IP200.198.12.1 80

4.1.6.4 TCP

TCP
Realhosts
1 TCP
NAT ACL
IP ACL

NAT

#

WAN UP ( ).

LAN

LAN

LAN Intranet

LAN

Internet

NAT

#

FTP

WEB

EMAIL

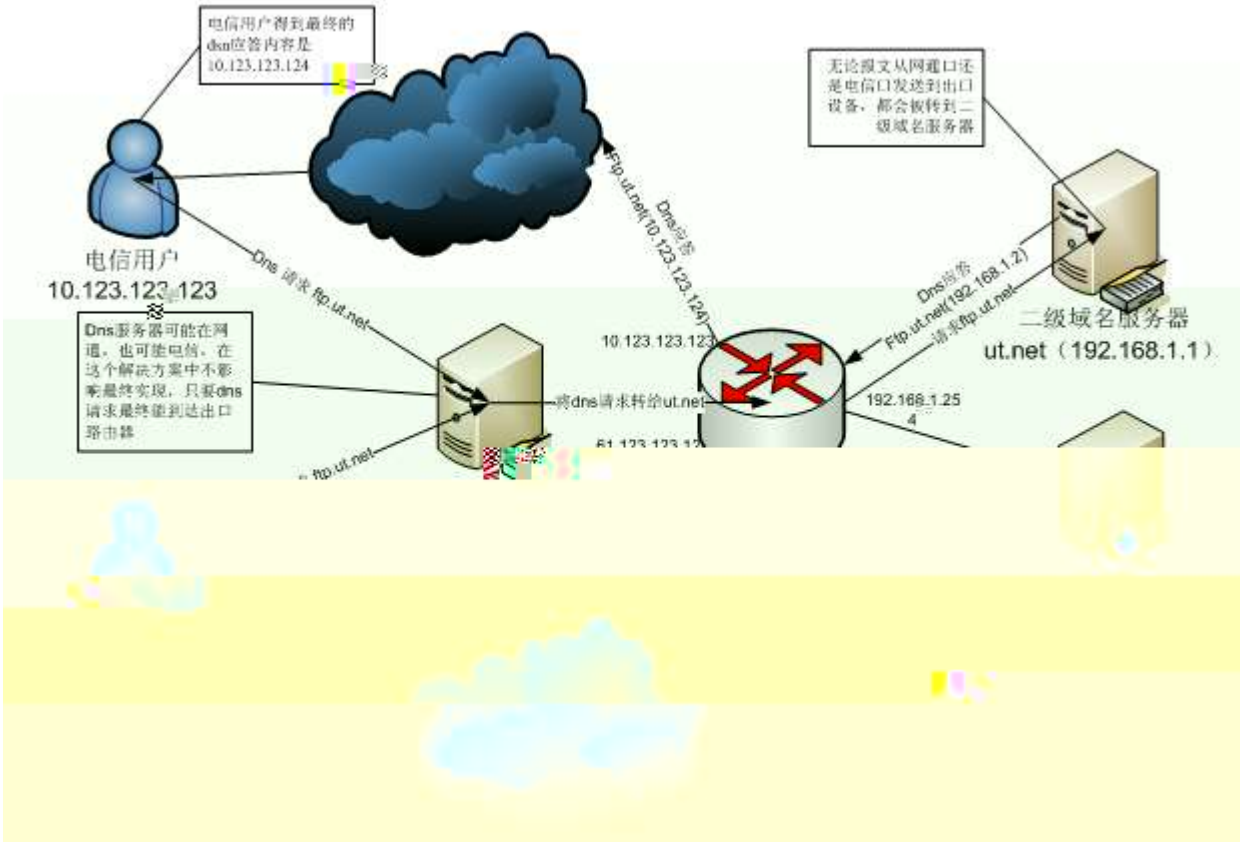
Telnet

#

#

#

4.1.6.6 NAT



interface GigabitEthernet 0/0
 ip address 10.123.123.123 255.255.255.0
 ip nat outside
 duplex auto
 speed auto
 description
interface GigabitEthernet 0/1
 ip address 61.123.123.123 255.255.255.0
 ip nat outside
 duplex auto
 speed auto
 description
interface GigabitEthernet 0/2
 ip address 192.168.1.254 255.255.255.0
 ip nat inside
 duplex auto
 speed auto
 description
 /*dns */

5.1.2

5.1.2.1 ECMP

ECMP

	10.3(4b8) ECMP ECMP 10.3(4b8) ECMP

5.1.2.2

5.1.2.3

/

5.1.2.4

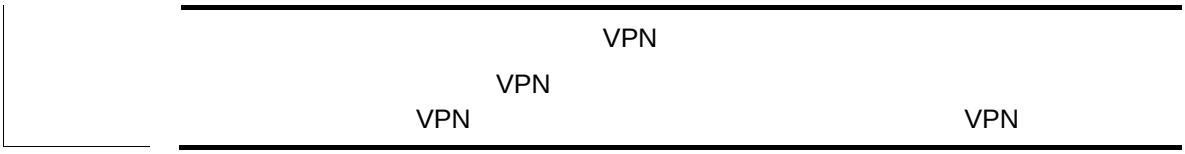
<< >>

5.1.2.5

5.1.3

5.1.3.1

(session) IP IP VRF



VPN

VPN

VPN VPN

5.1.3.2

ECMP

ECMP

	ecmp nexthop

5.2

5.2.1 /

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **mllb enable**	
	Ruijie(config)# **no mllb enable**	

#

#

5.2.2

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **interface** *interface-name*	
Step 3	Ruijie(config-if)# **bandwidth** *kilobits*	
	Ruijie(config-if)# **no bandwidth**	

1M

1000

#

5.2.3

Step 1	Ruijie# **configure te**	
Step 2	Ruijie(config)# **mllb poli** { **bandwidth** | **load**}	/
	Ruijie(config)# **nlb p**	

bandwidth

5.2.5 IP

IP

IP

mllb pdwidth

IP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **mllb first-choice** *interface-type interface-number*	
Step 3	Ruijie(config)# **no mllb first-choice**	

gi0/1

	Mllb 10.3(4b8) ECMP Mllb first-choice

5.2.7

+ /2

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)#**load-monitor** {**uplink** | **mixed-link**}	**uplink** **mixed-link**
Step3	Ruijie(config)#**end**	

#

#

5.2.8

5.3

5.3.1

show mllb config

Ruijie (config)# **show mllb config**	

show running-config

5.3.2

show over-load-protect configure

Ruijie (config)# **show over-load-protect configure**	

show over-load-protect configure

5.3.3

show load-monitor configure

Ruijie (config)# **show load-monitor configure**	

show load-monitor configure

5.4 1

5.4.1.1

ISP

2 gi0/2 gi0/3 1000M 500M

5.4.1.2

5.4.1.3

1

#

2

3

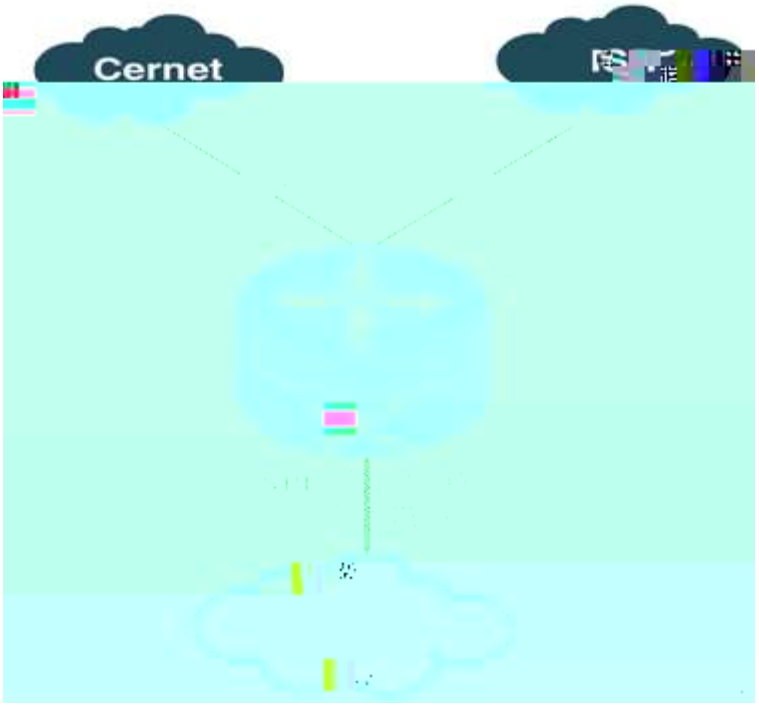
bandwidth

5.5

5.5.1.1

1000M gigabitEthernet 0/1 gigabitEthernet 0/2

5.5.1.2



5.5.1.3

1 1

#

2

3 1

1.
2.
3.
4.
5.
6.
7. URL
8.

1

1.1

1.1.1

vlan IP IP

1.1.2

vlan tag IP IP
vlan

1.1.2.1 vlan

vlan vlan id vlan
vlan tag
any native vlan vlan
native vlan vlan any

1.1.2.2

ip mac
ip mac ip mac
mac
ip mac
web vpn

1.1.2.3

ip

1.1.2.4

web ip mac IP
ip mac

1.2

1.3

1.3.1

Ruijie# **configure terminal**	
Ruijie(config)# **layer23 classify enable**	
Ruijie(config)#**end**	
Ruijie# **show running**	

no layer23 classify enable

#

1.4

1.4.1

Ruijie# **configure terminal**	
Ruijie(config)# **layer23 deny-mode enable**	
Ruijie(config)#**end**	
Ruijie# **show running**	

no layer23 deny-mode enable

Ruijie# **show running**	

no layer23 ad-mode enable

#

ad-mode

1.6 sam

sam

1.6.1

vlan

Ruijie#show vlan-group

vlan-group	police_flow	police_url	flow	vlan id
any	9	0	0	
vlan1	0	0	0	1
vlan2	0	0	0	3-5
vlan3	0	0	0	7,9

1.9

1.9.1

Ruijie# **configure terminal**	
Ruijie(config)# **subscriber static name** *name* **parent** *parent* [[**ip-host** *ip-addr*] [**mac** *mac-addr*] **| ip-subnet** *subnet mask* **| ip-range** *start end*] [**password** *pwd_str* { *two-way-bind* | *single-way-bind*}]	

Ruijie(config)#**end**

ip mac
ip mac ip mac
ip mac ip mac
ip mac

1 ip 192.168.196.156 1 1

Ruijie(config)#

1.9.2

Ruijie# **configure terminal**	
Ruijie(config)# [no] subscriber set *name* attribute {avoid-monitor [flow-monitor] | deny | release | vip | auth-deny | pwd-edit }	vip
Ruijie(config)#**end**	
Ruijie# **show subscriber** [**all** | **static** | **dynamic** | **parent** [*name* | **root**]]	

[no] subscriber set *name* attribute {avoid-monitor [flow-monitor] | deny | release | vip | auth-deny | pwd-edit }

flow-monitor

1.9.3

account

Ruijie# **configure terminal**	
Ruijie(config)# subscriber account privilege { none | { [webauth] [vpn] [login] }}	

/group1	user1	111	192.168.198.1		N
/group1	user2	123		00-d0-f8-01-d0-19	Y
/group1	user3	321	192.168.199.1	00-d0-f8-21-da-29	Y

userfile

Ruijie# subscriber import txt userfile

1.9.5

Ruijie# **subscriber export** [**txt** | **csv**] *filename*	

userfile

Ruijie# subscriber export txt userfile

1.9.6

1.9.7

1.11 / 0000.0000.0000 0

0 0 0 1 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1.11.1

Ruijie# **configure terminal**	
Ruijie(config)#**network-group name** *name* **[parent** *parent***]** [[**ip-host** *ip-addr*] **| ip-subnet** *subnet mask* **| ip-range** *start end*]	, parent
Ruijie(config)#**end**	

1.11.2

5þB&Ö

Ruijie# **network-group import** [**txt** | **csv**] *filename*	
Ruijie# **show network-group [all | brief | parent [root |** name **]]**	

.txt

ip

.txt

/ / 1, 1,192.168.197.1

.csv Microsoft Excel .csv

3 ip

.csv

/group1 xinlang 192.168.196.11-192.168.196.25

/group1 baidu 192.168.197.0/24

/group1 user1 192.168.198.1

/group1 user2

userfile

Ruijie# network

1.12.2

Ruijie#**network-group** *xx* **move to parent** *yy*	

5

:

xx yy

Ruijie# **network**

1.14

Ruijie#**show auth-subs [all | brief | parent [root |**	

2

2.1

2.1.1

2.1.2.3

IP

2.1.2.4

2.1.2.5 DFI

DFI

P2P DFI

2.1.2.6

IP IP

2.1.2.7

IP

HTTP P2P

2.1.2.8

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application app-db enable**	
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie#**show running**	

no identify-application app-db enable

2.3.3

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application proto-expect enable**	
Step3	Ruijie(config)#**identify-application proto-expect timeout** *seconds*	
Step 4	Ruijie(config)#**end**	
Step 5	Ruijie# **show identify-application proto-expect**	

no identify-application proto-expect enable

5

Ruijie(config)# identify-application proto-expect timeout *300*

2.3.4

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application proto-expect gather**	

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application proto-detect drop**	
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie#**show running**	

no identify-application proto-detect drop

2.3.7 DFI P2P

DFI P2P

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application dfi enable**	DFI P2P
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie#**show running**	

DFI P2P no identify-application dfi enable

DFI P2P

P2P DPI
P2P
DPI P2P P2P

P2P P2P

2.3.10

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-**	

#

show identify-application class

2.3.11

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application key** *app-name*	app-name
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie#**show identity-application key**	

no identity-application key *app-name*

FTP

Ruijie(config)# identify-application key *FTP*

Ruijie(config)#

2.3.12

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application inhibitive** *app-name*	app-name
Step 3	Ruijie(config)#**end**	

Step 3	Ruijie(config)#**end**	
Step 4	Ruijie# **show identify-application route enhance**	

no identify-application route enhance enable

2.3.16 HTTP

HTTP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application http route enhance enable**	HTTP
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie# **show identify-application route enhance**	

no identify-application http route enhance enable

2.3.17

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application web-cache enable**	
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie# **show run**	

no identify-application web-cache enable

2.3.18

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

show identity-application key	
show identity-application inhibitive	
show identity-application block	
show identity-application class	
show identity-application group-state	
show identify-application disable application	
show identify-application user-group *group-name*	
show identify-application expect	

show identify-application 35..*enhance

#

FTP

#

#

myP2P 249-0-0-0

#

FTP

Ruijie# show identify-application custom-group *myqq*

QQ

MSN

#

#

Ruijie#show identity-application route enhance

identify-application route enhance: on

identify-application http route enhance: on

#

Ruijie#show identify-application route enhance table

..route enhance enable application list..

|

UUSEE_PC|IPad 4-33-0-0

QVOD 4-48-0-0

BITTORRENT 5-3-0-0

|

FLASHGET 5-34-0-0

P2P-FTP 5-50-0-0

2.4

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **identify-application clear key-inhibitive-block group**	
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie#**show running**	

#

Ruijie(config)# identify-application clear key-inhibitive-block group

Ruijie(config)#

3

3.1

3.1.1

IP IP

ADSL M 7-8
+ADSL

P2P

ADSL

3.1.2

3.1.2.1

3.1.2.2

HTTP

HTTP HTTP

HTTP HTTP

)] TJETQQQ245.1 4

3.1.2.4

DOWN DOWN IP
DOWN

3.1.2.5

3.1.2.6

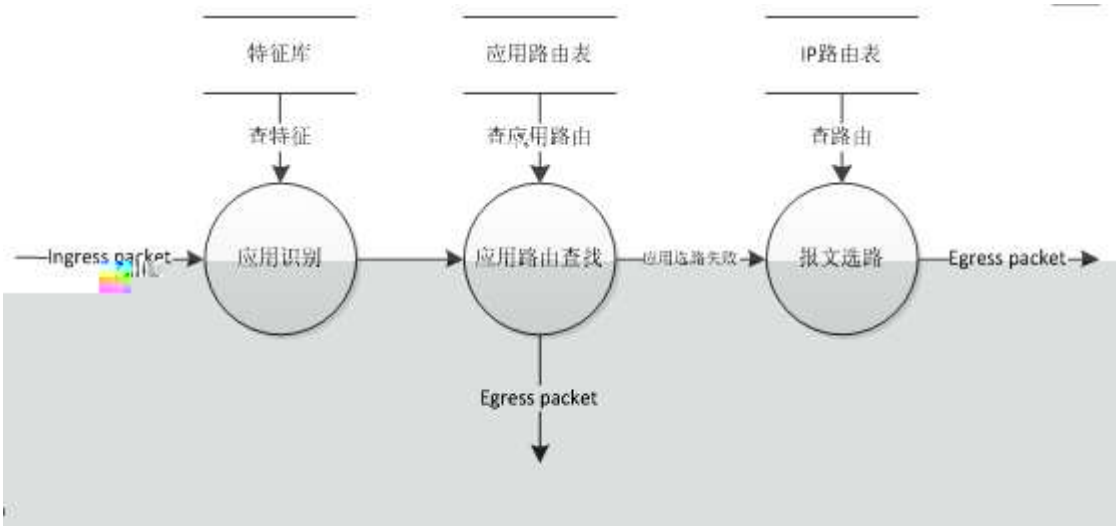
WAN WAN
WAN

3.1.3

3.1.3.1

IP

IP



3.1.3.2 NAT

IP

NAT IP

80%

3.1.3.3 DNS

DNS DNS

DNS DNS
IP
IP PC DNS

DNS HTTP DNS HTTP
DNS

DNS
DNS DNS DNS DNS
IP DNS

DNS

3.1.4

3.2

3.3

3.3.1

Step 1	Ruijie>**enable**	
Step 2	Ruijie# **configure terminal**	
Step 3	Ruijie(config)# **app route enable**	
Step 4	Ruijie(config)# **end**	

no app route enable

3.3.2

Step 1	Ruijie>**enable**	
Step 2	Ruijie# **configure terminal**	
Step 3	Ruijie(config)# **app route enable**	
Step 4	Ruijie(config)# **app route** *app-name* { **interface** *interface-name* | **interface-group** *group-name*} [**time-range** *time-rang-name*]	*app-name* **interface** *interface-name* **interface-group** *group-name* **time-range** *time-rang-name*

no interface *interface-name*

no load-balance

IP hash

inhibitive_intf_group dialer 1 dialer 2 dialer 3

Router(config)#interface-group inhibitive_intf_group

Router(config-intf-group)#interface-member dialer 1

Router(config-intf-group)#interface-member dialer 2

Router(config-intf-group)#interface-member dialer 3;

Router(config-intf-group)#load-balance policy load

Router(config-intf-group)#exit

	WAN dialer WAN WAN LAN

3.3.4

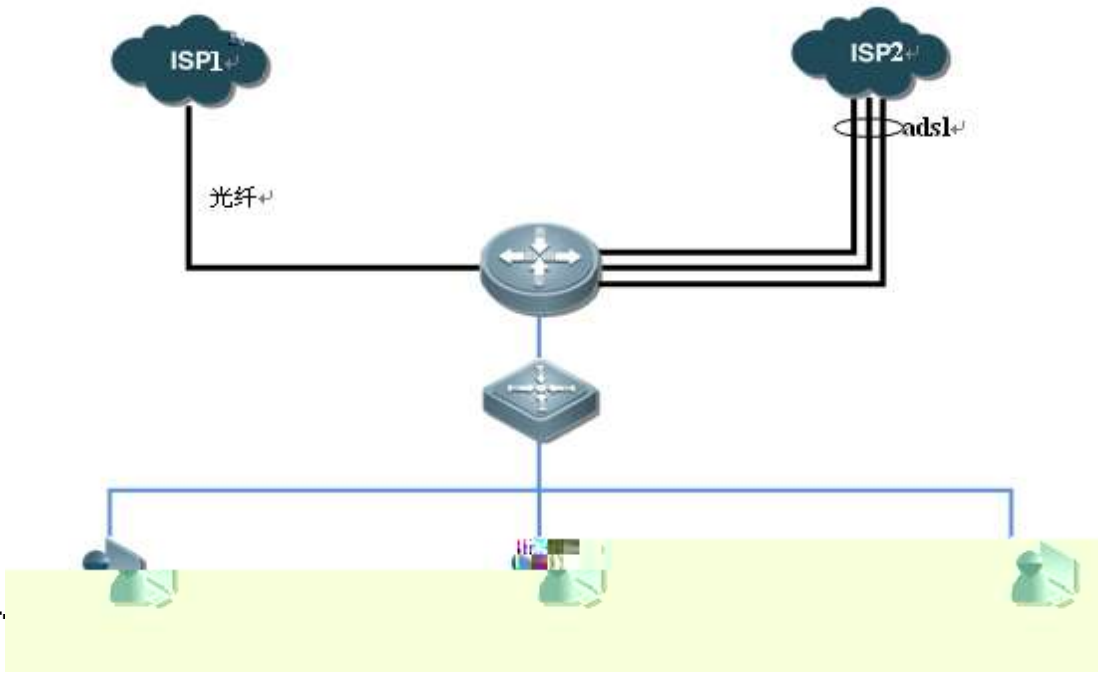
WAN

	WAN WAN LAN

3.3.5

show app route [**statistics** | *app-name* [**session**]]	
show interface-group	

3.4.1.2



3.4.

1

1 + ADSL

#

Router(config)#ip route 0.0.0.0 0.0.0.0 202.100.12.5

2

dialer 1,2,3

#

3

4

#

http

3.4.1.4

1

```
Router#show  app  route
CLASS                INTERFACE(GRPUP)                    time-range     state
-------------  ------------------------------  ------------ -----
P2P                  inhibitive_intf_group(group)     NA                UP
                     inhibitive_intf_group(group)     no_midnight    UP
HTTP                 inhibitive_intf_group(group)     no_midnight    UP
                     inhibitive_intf_group(group)     NA                UP
                     inhibitive_intf_group(group)     NA                UP
                     inhibitive_intf_group(group)     NA                UP
```


CLASS

HIT DATA(byte) HIT RATE(Mb/s)

SUM DATA(byte) SUM RATE(Mb/s)

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

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

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

HTTP inhibitive_intf_group(group)

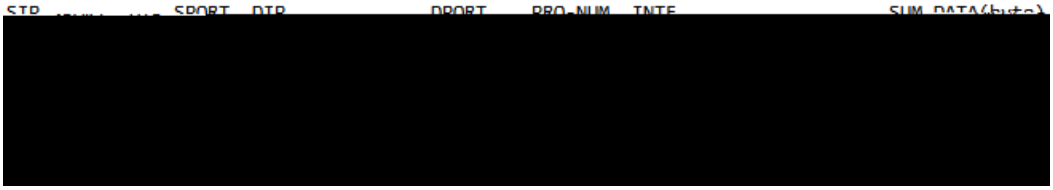
81535/297997 0.5/3.75

101918/342496 0.6/4.68

CLASS	
INTERFACE(GROUP)	
HIT DATA(byte)	
HIT RATE(Mb/s)	
SUM DATA(byte)	
SUM RATE(Mb/s)	

3 HTTP

Router#show app route HTTP session



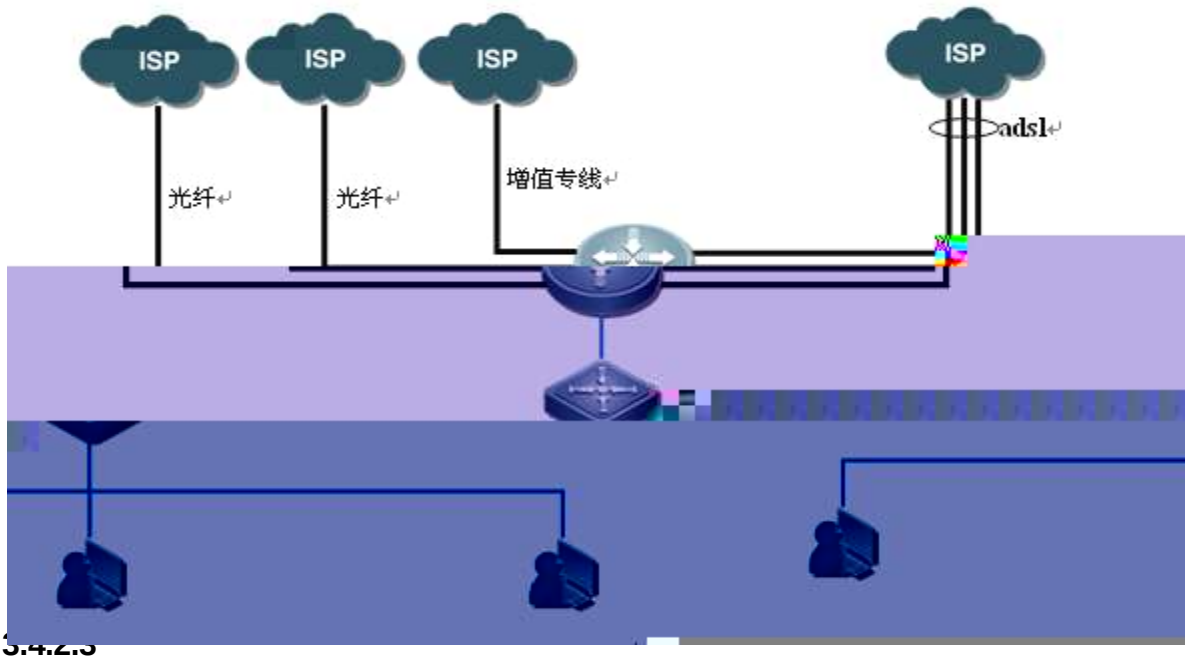
SIP	
SPORT	
DIP	
DPORT	
SUM DATA(byte)	

3.4.2 + ADSL

3.4.2.1

3 ADSL
88.0.0.0/8 80
ADSL

3.4.2.2



3.4.2.3

2 + ADSL

1

ecmp

Router(config)#ip route 0.0.0.0 0.0.0.0 gi0/1 202.100.12.51

Router(config)#ip route 0.0.0.0 0.0.0.0 gi0/2 202.96.128.86

2

gi0/1 gi0/2

Router(config)#route-auto-choose cnii gi0/1 202.100.12.51

Router(config)#route-auto-choose cnc gi0/2 202.96.128.86

3 PBR

88.0.0.0/8 www 88.0.0.1

Router(config)# access-list 100 permit ip any 88.0.0.0 0.255.255.255

Router(config)# access-list 101 permit tcp any any eq www

Router(config)# route-map RM_FOR_PBR 10

Ruijie(config-route-map)#match ip address 100

Ruijie(config-route-map)#match ip address 101

Ruijie(config-route-map)#set ip nexthop 88.0.0.1

Gi 0/0

Ruijie(config)#interface GigabitEthernet 0/0

Ruijie(config-if)#ip policy route-map RM_FOR_PBR

2

dialer 1,2,3

#

3

4

#

#

3.4.2.4

1

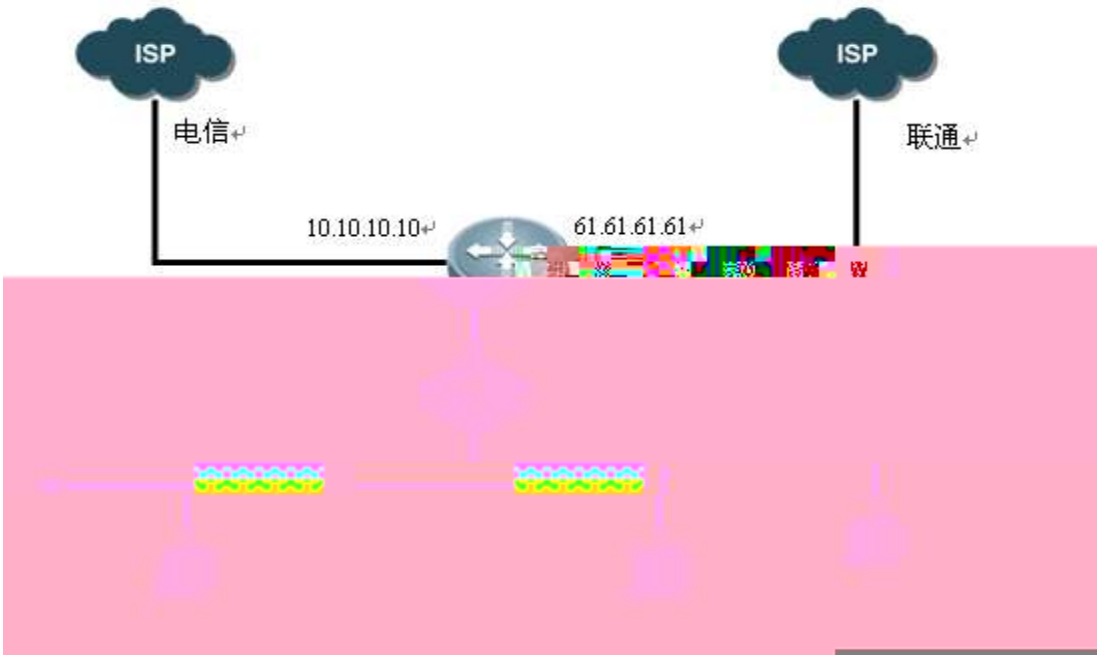
```
Router#show  app  route
CLASS                 INTERFACE(GRPUP)                        time-range     state
------------  ------------------------------  ------------ -----
P2P                   inhibitive_intf_group(group)     NA                  UP
                      inhibitive_intf_group(group)     no_midnight    UP
                      inhibitive_intf_group(group)     NA                  UP
                      inhibitive_intf_group(group)     NA                  UP
                      inhibitive_intf_group(group)     NA                  UP
```

2

```
Router#show  app  route  statistics
CLASS                 INTERFACE(GROUP)
HIT DATA(byte)  HIT RATE(Mb/s)
SUM DATA(byte)  SUM RATE(Mb/s)
------------ ----------------------------
------------  ------------
------------  --------------
P2P                   inhibitive_intf_group(group)
92333/297997       0.6/3.75
202918/342496      0.7/4.68
                      inhibitive_intf_group(group)
```

31030/

3.4.3.2



3.4.3.3

3

1

#

Router(config)#ip route 0.0.0.0 0.0.0.0 202.100.12.51

2

3 DNS

DNS

4

5

#

http

SUM DATA(byte) SUM RATE(Mb/s)

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

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

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

P2P inhibitive_intf_group(group)

92333/297997 0.6/3.75

202918/342496 0.7/4.68

inhibitive_intf_group(group)

31030/101901 0.2/1.75

401189/212002 0.3/2.61

inhibitive_intf_group(group)

10120/201331 0.1/2.57

100121/204691 0.2/2.98

inhibitive_intf_group(group)

41035/97997 0.3/1.01

60168/91067 0.1/1.41

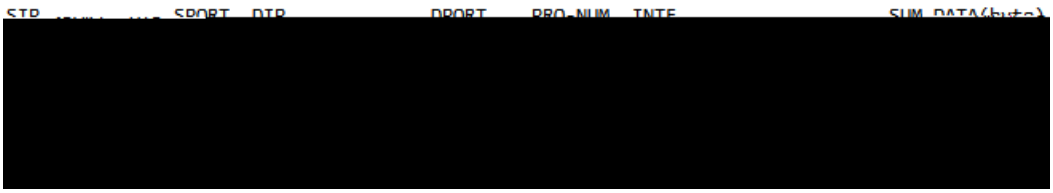
inhibitive_intf_group(group)

20136/40359 0.1/0.98

21031/60594 0.2/2.01

3

Router#show app route HTTP session

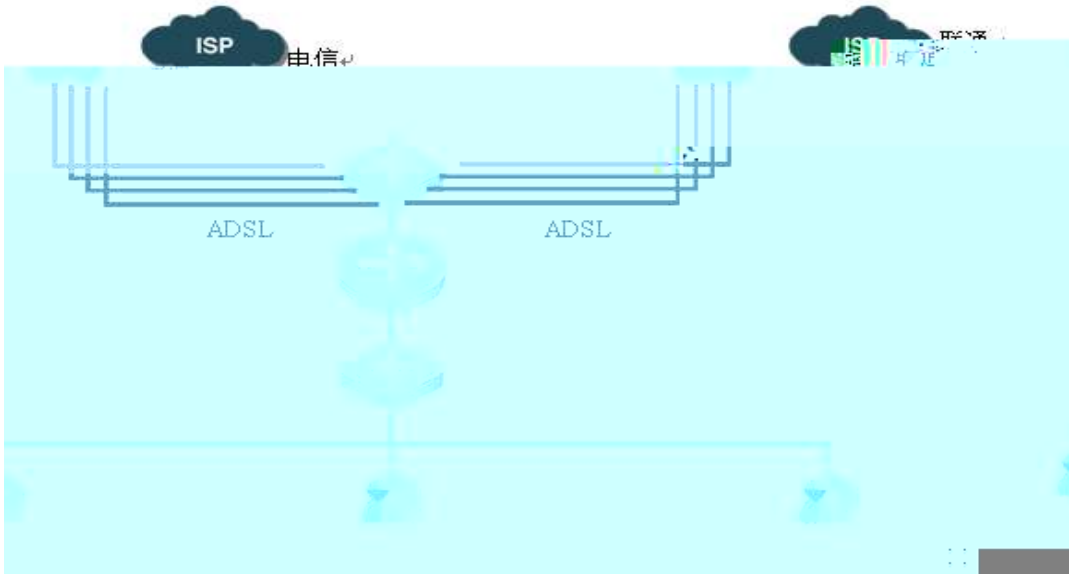


3.4.4 ADSL

3.4.4.1

ISP ADSL
30 ADSL 20 ADSL

3.4.4.2



3.4.4.3

4 ADSL

1

20 ADSL

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 30

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 31

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 32

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 33

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 34

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 35

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 36

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 37

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 38

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 39

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 40

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 41

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 42

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 43

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 44

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 45

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 46

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 47

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 48

Router(config)#ip route 0.0.0.0 0.0.0.0 dialer 49

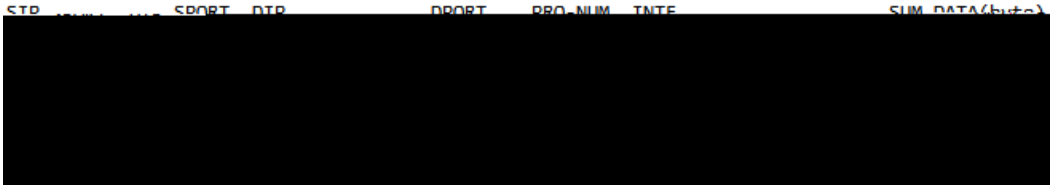
2

ADSL dialer 1-30

#

3

inhibitive_intf_group(group)	NA



4

4.1

4.1.1

VOIP Voice Over Internet Protocol P2P Peer-to-Peer
P2P

1
QOS

2 / / /
/

a) P2P /

b) PC

c)

3

a) PC
IP

b) IP IP

4.1.2

by-pass

4.1.3

4.2

4.3

/

ACL

IP

IP

#

Ruijie# configure terminal

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

Ruijie(config)# no flow-pre-mgr enable

4.3.2

4.3.3 /

/

/

Step 1	Ruijie(config)# **flow-pre-mgr** *rule-id* **subscriber** *subs_name* **action {block | by-pass | {trust total-limit** *total-limit-number* **per-ip-limit** *per-limit-number* **}}**	/ block by-pass trust rule-id 1~50 subs_name total-limit-number / 0 per-limit-number / IP *total-limit-number* 0

no flow-pre-mgr *id*

1 2 action block by-pass trust / IP

1 2

UserGroupA 5000 UserGroupA IP
300

Ruijie# configure terminal

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

	1
	2 ACL
	3 ACL ACL IP IP ACL
	4

1

ACL IP 220.200.20.20 30

Ruijie# configure terminal

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

Ruijie(config)#ip access-list extended 120

Ruijie(config-ext-nacl)#permit ip any host 220.220.20.20

Ruijie(config-ext-nacl)#deny ip any any

Ruijie(config-ext-nacl)#exit

Ruijie(config)#flow-pre-mgr 2 access-list 120 action trust total-limit 30

2

IP 192.168.1.0/24 IP

192.1.0.8 T T #ip 251/Z.

4.3.5

Step 1	Ruijie(config)# **flow-pre-mgr priority-swap** *rule-id1 rule-id2*	rule-id1 rule-id2

1 rule-id1 rule-id2
2 rule-id1 rule-id2

4.3.6 IP

IP

Step 1	Ruijie(config)# **ip upload-pps-limit** *limit-num*	IP Limit-num 0~10W 0

no **ip upload-pps-limit**

1 IP

1 Limit-num

1

1000

Ruijie# configure terminal

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

iiie#

4.3.8

Step 1	Ruijie(config)# **ip new-session-limit start-up limit** *limit-num*	Limit-num 0~10W 0

no ip new-session-limit start-up

1

1 Limit-num

1

3000

Ruijie# configure terminal

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

Ruijie(config)# ip new-session-limit start-up limit 3000

4.3.9

Step 1	Ruijie(config)# **ip new-session-limit virtual-host limit** *limit-num*	Limit-num 0~10W 0

no ip new-session-limit virtual-host

1	IP	IP	IP

1 Limit-num

1

3000

Ruijie# configure terminal

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

Ruijie(config)# ip new-session-limit virtual-host limit 3000

4.3.10

Step 1	Ruijie(config)# **ip new-session-limit real-host limit** *limit-num*	Limit-num 0~10W 0

no ip new-session-limit real-host

1	IP	IP	

1 Limit-num

1

200

Ruijie# configure terminal

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

Ruijie(config)# ip new-session-limit real-host limit 200

4.3.11 IP

IP

Step 1	Ruijie(config)# **ip new-session-limit specify-host** *A.B.C.D* **limit** *limit-num*	IP A.B.C.D IP Limit-num 0~10W 0

no ip new-session-limit specify-host

4.3.12

Ruijie# **show flow-pre-mgr rule-info**	
Ruijie# **show flow-pre-mgr ip-info** [*ip-address*]	IP IP ip-address IP IP

Ruijie# show ip upload-pps-limit

-Ä

4.4

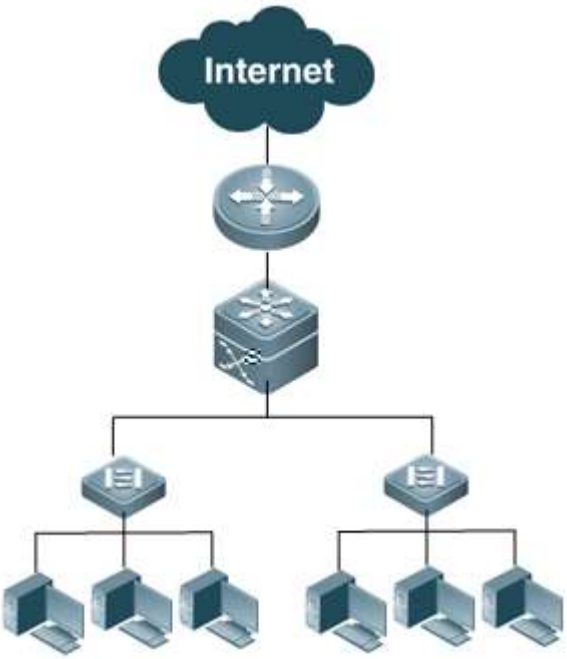
4.4.1

20

IP 500

IP 1000

4.4.2



4.4.3

1

#

Ruijie# configure terminal

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

#

Ruijie(config)# subscriber static name LeaderGroup parent /

#

Ruijie(config)# subscriber static name LeaderA parent /LeaderGroup ip-host 192.168.5.11

Ruijie(config)# subscriber static name LeaderB parent /LeaderGroup ip-host 192.168.5.12

2

#

#

#

5

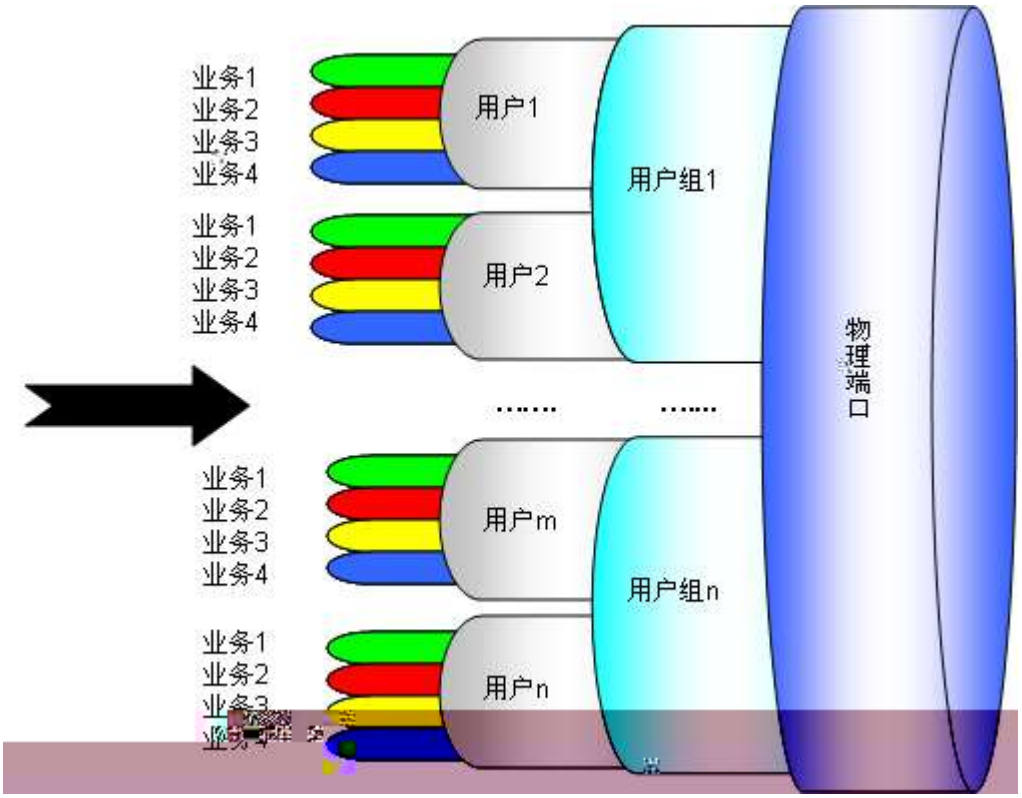
5.1

5.1.1

(Flow Control)

P2P

5.1.2



5.1.2.1

5.1.2.1.1

1.
2.

5.1.2.1.2

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

10M **cir** 5M
pir 10M 10M

5.1.2.1.3

1 0 7 0 7
2

5.1.2.1.4

SFQ Per-net

SFQ(Stochastic Fairness Queueing) 128
128 128

SFQ Per-net

Per-net
Per-net

SFQ

10M BT HTTP

BT HTTP
DUT HTTP 5M

PIR CIR
CIR PIR BT PIR 2M
DUT BT 5M 2M BT
BT HTTP

5.1.2.3

P2p

TCP

1	TCP UDP
2	4

5.1.2.4

5.1.2.4.1

Normal
Per-IP

5.1.2.6

tpl

Flow-control

5.1.2.7

5.3

5.3.1

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)#**flow-control** *Name*	
Step 3	Ruijie# **show running**	

no flow-control *Name*

#

5.3.2

Step 3	Ruijie(config-flow-control)# **exit**	**flow-control**
Step 4	Ruijie(config)#**interface Gi** *0/1*	
Step 5	Ruijie(config-if-GigabitEthernet 0/1)# **flow-policy** *Name*	Gi 0/1
Step 6	Ruijie(config-if-GigabitEthernet 0/1)# **end**	
Step 7	Ruijie# **show running**	

no flow-policy

flow-control	no channel-tree {inbound | outbound}

#

5.3.4

B{0b#'ɵ!3Fl''/!$0b#0#k@ŠW!20#k'v1T@BPC&ci&!‡P€X

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)#**flow-control** *Name*	
Step 3	Ruijie(config-flow-control)# **channel-tree inbound**	
Step 4	[redacted]	

1. **cir** **pir**
2. **cir** **cir** **cir**

depart1

5.3.6

Step 1	Ruijie#

5.3.7

#

root 1000000 1000000 4 fifo

#

5.5

Ruijie(config)# **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

5.6

Ruijie(config)# **show flow-control-policy rule [group** *name***]**	

#

Ruijie#show flow-control-policy rule

5.7.2

Wan

5.7.3

#

#

flow-control *Corp*

1 2 3 department1 department2 department3

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*

5.8 Normal

5.8.1

10M 2

5.8.2

Wan

5.8.3

Time-range any

time-range any

periodic Daily *0:00* to *23:59*

#

subscriber static name *depart1* parent / ip-

1 BT BT

channel-group *depart1-BT* **pool** *BT*

channel-group *depart2* parent *root* cir *5000* pir *10000* pri *4* schedule-type fifo

channel-group *depart2-BT* parent *depart2* cir *1000* pir *5000* pri *4* schedule-type fifo

2 BT BT

channel-group *depart2-BT* pool *BT*

channel-default *root*

!

channel-tree outbound

share-pool *BT* rate *6000* type normal

channel-group *root* parent null cir *10000* pir *10000* pri *4* schedule-type fifo

channel-group *depart1* parent *root* cir *5000* pir *10000* pri *4* schedule-type fifo

channel-group *depart1-BT* parent *depart1* cir *1000* pir *5000* pri *4* schedule-type fifo

1 BT BT

channel-group *depart1-BT* pool *BT*

channel-group *depart2* parent *root* cir *5000* pir *10000* pri *4* schedule-type fifo

channel-group *depart2-BT* parent *depart2* cir *1000* pir *5000* pri *4* schedule-type fifo

2 BT BT

channel-group *depart2-BT* pool *BT*

channel-default *root*

!

1 2 BT

flow-rule *1* vlan-group any subscriber *depart1* network-group any app-group any time-rang *any*

flow-rule *1* session-limit *0* action pass in-channel *depart1* out-channel *depart1*

flow-rule *2* vlan-group any subscriber *depart2* network-group any app-group any time-rang *any*

flow-rule *2* session-limit *0* action pass in-channel *depart2* out-channel *depart2*

1 2 BT

flow-rule *3* vlan-group any subscriber *depart1* network-group any app-group *BITTORRENT* time-rang *any*

flow-rule *3* session-limit *0* action pass in-channel *depart1-BT* out-channel *depart1-BT*

flow-rule *4* vlan-group any subscriber *depart2* network-group any app-group *BITTORRENT* time-rang *any*

flow-rule *4* session-limit *0* action pass in-channel *depart2-BT* out-channel *depart2-BT*

#

interface GigabitEthernet 0/1

ip address ……

flow-policy *Dianxin*

5.9 Per-IP

5.9.1

10M

500 BT 800k 512k

BT 5M 7M

1M

5.9.2

Wan

5.9.3

Time-range any

time-range any

periodic Daily *0:00* to *23:59*

BT BITTORRENT

#

flow-control Dianxin

channel-tree inbound

share-pool *PER-USER* rate *1000* type per-ip limit *500*

channel-group *root* parent null cir *10000* pir *10000* pri *4* schedule-type per-net per-mask *32* per-cir *10* per-pir *1000* limit *500*

BT 1M

channel-group *root* pool *PER-USER*

channel-group *BT* parent *root* cir *1000* pir *5000* pri *4* schedule-type per

BT 1M

channel-group *root* pool *PER-USER*

channel-grou
per-cir *1* per-p

channel-gr
per-cir *1* per

channel-

flow-rul ny subscriber any network-group any app-group *BITTORRENT* time

5.10.2

Global

5.10.3

Time-range any

time-range any

periodic Daily *0:00* to *23:59*

subscriber static name *DP-test* parent / ip-subnet *192.168.10.0 255.255.255.0*

flow-control global

flow-rule *1* vlan-group *any* subscriber *any* network-group *any* app-group *P2P* time-rang *any*

flow-rule *1* session-limit *0* action drop

flow-rule *2* vlan-group *any* subscriber *DP-test* network-group *any* app-group *any* time-rang *any*

flow-rule *2* session-limit *0* action pass

6

6.1

6.1.1

IP IP IP

6.1.2

IP IP

6.2

6.3

/ /

VPN

6.3.1

Step 1	Ruijie# **configure terminal**

6.3.4

8

8

8

6.3.6 / /

3

Step 1	Ruijie# **configure terminal**	
Step 2	uijie(config) **flow-audit generate-report** *hour*	， 24
Step 3	Ruijie(config-if)#**end**	
Step 4	Ruijie# **show running**	

no flow-audit generate-report

/ / 12:

6.3.7

50%

Step 1	Ruijie# **configure terminal**	
Step 2	uijie(config) **flow-audit hard-disk-quota** *percent*	percent 1~100
Step 3	Ruijie(config-if)#**end**	
Step 4	Ruijie# **show running**	

no flow-audit hard-disk-quota

1	
2	50%

80%

Ruijie# configure terminal

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

Ruijie(config)# flow-audit hard-disk-quota *70*

6.3.8 VPN

VPN IP
IP

Step 1	Ruijie# **configure terminal**	
Step 2	uijie(config) **flow-audit vpn {inside-ip | outside-ip}**	VPN inside-ip IP outside-ip IP .
Step 3	Ruijie(config-if)#**end**	
Step 4	Ruijie# **show running**	

flow-audit vpn outside-ip

VPN VPN IP

Ruijie# configure terminal

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

Ruijie(config)# flow-audit vpn outside-ip

VPN VPN
IP

Ruijie# configure terminal

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

Ruijie(config)# flow-audit vpn inside-ip

6.4

Ruijie# **show online statistics** {**global** | **interface** *interface-name* **| bridge** *bridge-name*} [{**detail** [**offset** start-record {**limit** record-num}] **| recent** *hour* **| minute_interval** *begin-*	

Ruijie# **show flowrate channel** [**channel-group** *channel-group*] [**minute_interval** *begin-year begin-month begin-day begin-hour:*

Ruijie# **show flowrate ip** {**global** | {**interface** *interface-name* **| bridge** *bridge-name*} [**by-vpn**]} [**subscriber-group** *subscriber-group* **by-group** | [[**subscriber-group** *subscriber-group*] [**subscriber** *subscriber-name*] [**vip**] | {**by-auth**} [**auth-subs-group** *auth-group-name*] [**auth-subs** *auth-name*]] [**ip** *ip-address*] [**application** *application-name*] [**application-group** *application-group*] [**application-type** *application-type*]] [{**recent** *hour* | **minute-interval** *begin-year begin-month begin-day begin-hour:begin-minute* **to** *end-year end-month end-day end-hour: end-minute* | {[**month** | **week**] **day-interval** *begin-year begin-month begin-day* **to** *end-year end-month end-day* | **day** *begin-year begin-month begin-day*} [**hour-interval** *begin-hour1* **to** *end-hour1* [*begin-hour2* **to** *end-hour2*]]}] [**order-by** {{**pass** | **drop**} {**upload** | **download**

path: bridge-map 0

online ip count: 251

online session: 254

1 IP

Ruijie# show online statistics interface gigabitEthernet 0/1 recent 1
path: GigabitEthernet 0/1
recent hour: 1
Time slice: 60 min
count:1

ID	Online-IP	Online-Session	time
1	95	522	2012-1-5 10:00

2011 12 22 10 10 10 20 IP

Ruijie# show online statistics global minute-interval 2011 12 22 10:10 to 2011 12 22 10:20
Time slice: 1 min
count: 10

ID	Online-IP	Online-Session	time
1	95	588	2011-12-22 10:11
2	96	598	2011-12-22 10:12
3	94	590	2011-12-22 10:13
4	96	528	2011-12-22 10:14
5	96	586	2011-12-22 10:15
6	97	546	2011-12-22 10:16
7	99	566	2011-12-22 10:17
8	97	542	2011-12-22 10:18

/User_groupA/User_nameA
192.168.196.33 2010-1-8 16:52 43
5719 0 0 0

2011 12 22 1 2 ip

Ruijie# show online ip global minute-interval 2011 12 22 1:0 to 2011 12 22 2:0
Subscriber
IP OnlineTime(min)
PASS-Upload(KB) PASS-Download(KB) DROP-Upload(KB) DROP-Download(KB)
/User_groupF/User_nameF
192.168.196.63 75
76 360 0 0
/User_groupE/User_nameE
192.168.196.53 90
103 399 0 0
/User_groupC/User_nameC
192.168.196.37 95
17654 4675 0 0

gigabitEthernet 0/1 IP
Ruijie#show online ip history interface gigabitEthernet 0/1
path:GigabitEthernet 0/1
Subscriber
IP AuthType LoginTime LogoutTime
PASS Upload(KB) Download(KB) Upload(packets) Download(packets)
DROP Upload(KB) Download(KB) Upload(packets) Download(packets)
/User_groupA/User_nameA
192.168.203.41 2010-1-2 2:12 2010-1-2 2:25
1 3 16 14
0 0 0 0
/User_groupB/User_nameB
192.168.196.39 2010-1-2 2:17 2010-1-2 2:25
3 25 34 29
0 0 0 0

gigabitEthernet 0/1 IP 192.168.196.70 IP

Ruijie#show online ip-application interface gigabitEthernet 0/1 ip 192.168.196.70
count:1
path:GigabitEthernet 0/1
Subscriber
IP Application Application-group Application-type
LoginTime OnlineTime(min)
PASS-Upload(KB) PASS-Download(KB) DROP-Upload(KB) DROP

Ruijie# show flowrate channel channel-name “NBR ” minute -interval 2012 1 6 12:0 to 2012 1 6 12:40
channel_group: channel_groupA
channel_name: channel_nameA
type: down
PASS: 21190 KB, 281800 Packets
DROP: 0 KB, 0 Packets

channel_group: channel_groupB
channel_name: channel_nameB
type: up
PASS: 16640 KB, 90220 Packets
DROP: 0 KB, 0 Packets

gigabitEthernet 0/1 2011 1 8 2 2011 1 14 11
Ruijie# show flowrate interface gigabitEthernet 0/1 time-interval 2011 1 8 2 to 2011 1 14 11
Interface:GigabitEthernet 0/1
PASS upload: 14478835 KB, 30655170 Packets
PASS download: 6342862 KB, 22501788 Packets
DROP upload: 1 KB, 200 Packets
DROP download: 5 KB, 1020 Packets

2011 12 10 2011 12 19
Ruijie# show flowrate interface gi0/3 month day-interval 2011 12 10 to 2011 12 19 hour-interval 1 to 5 detail
Interface:GigabitEthernet 0/3
Time Slice:240 min

ID	Pass_upload(KB)	Pass_download(KB)	Drop_upload(KB)	Drop_download(KB)	time
1	2817	873	12	10	2011-12-10 4
2	7963	1539	10	10	2011-12-11 4
3	13062	2290	9	12	2011-12-12 4
4	956	785	5	42	2011-12-13 4
5	2817	125	8	5	2011-12-14 4
6	7960	1630	6	4	2011-12-15 4
7	13089	2290	2	9	2011-12-16 4
8	957	785	5	1	2011-12-17 4
9	13089	2290	3	1	2011-12-18 4
10	957	785	5	1	2011-12-19 4
Total	49621	14140	65	95	

gigabitEthernet 0/1 2010 1 8 2010 1 12

path: GigabitEthernet 0/1
day-interval: 2010-1-8 ~ 2010-1-12
Subscriber ip
PASS Upload(KB) Download(KB) Upload(packets) Download(packets)
DROP Upload(KB) Download(KB) Upload(packets) Download(packets)
/User_groupA/User_nameA 172.18.3.34
0 2871 0 16161
0 0 0 0
/User_groupB/User_nameB 172.18.3.50
153987 0 2022024 0
0 0 0 0
/User_groupC/User_nameC 172.18.3.64
153986 0 2022024 0
0 0 0 0
/User_groupD/User_nameD 172.18.3.65
213285 0 2800725 0
0 0 0 0
/User_groupE/User_nameE 172.18.33.50
161994 0 2127179 0
0 0 0 0

2011 12 22 10 12
Ruijie(config)#show flowrate ip global day 2011 12 22 hour-interval 10 to 12 detail
day-interval: 2011-12-22 ~ 2011-12-22
hour-interval: 10 ~ 12, 0 ~ 0
time-interval(min): 10
Subscriber
ip pass_up(KB) pass_down(KB) drop_up(KB) drop_down(KB)
time
/User_groupA/User_nameE
192.168.1.3 191 283 1 2
2011-12-22 10:2
/User_groupA/User_nameA
192.168.1.3 191 283 2 3
2011-12-22 10:12
/User_groupA/User_nameA
192.168.1.3 351 986 3 2
2011-12-22 10:22
/User_groupA/User_nameB
192.168.1.4 180 275 3 1
2011-12-22 10:32
/User_groupA/User_nameB
192.168.1.4 312 960 2 2
2011-12-22 10:42
/User_groupA/User_nameC
192.168.1.5 300 470 3 4
2011-12-22 10:52
/User_groupA/User_nameE

192.168.1.3 182 280 3 6
2011-12-22 11:2
/User_groupA/User_nameA
192.168.1.3 186 260 7 2
2011-12-22 11:12
/User_groupA/User_nameA
192.168.1.3 340 980 1 2
2011-12-22 11:22
/User_groupA/User_nameB
192.168.1.4 160 245 3 4
2011-12-

/

gi0/3 2012 1 5 2012 1 13 1 5

Ruijie#show flowrate application interface gi0/3 by-group month day-interval 2012 1 5 to 2012 1 13 hour-interval 1 to 5 detail

path:GigabitEthernet 0/3

day-interval: 2012-1-5 ~ 2012-1-13

hour-interval: 1 ~ 5, 0 ~ 0

time-interval(min): 240

Application Pass_up KB Pass_down KB

Drop_up(KB) Drop_down(KB) time

360 -UPDATE 2 41

1 2 2012-1-5 4

BQQ 12 12

1 0 2012-1-6 4

IT 0 1

2 1 2012-1-7 4

360 -UPDATE 2 40

3 0 2012-1-8 4

BQQ 12 12

1 2 2012-1-9 4

IT 0 1

0 1 2012-1-10 4

360 -UPDATE 2 60

1 2 2012-1-11 4

BQQ 12 12

1 0 2012-1-12 4

IT 5 1

0 1 2012-1-13 4

==========

Total 47 180

10 10

gigabitEthernet 0/1 IP 172.18.36.102 IP

Ruijie#show flowrate ip-application interface gigabitEthernet 0/1 ip 172.18.36.102

path:GigabitEthernet 0/1

Subscriber ip Application Application-group Application-type

PASS Upload(bps) Download(bps) Upload(pps) Download(pps)

DROP: Upload(bps) Download(bps) Upload(pps) Download(pps)
/user_groupA/user_nameA 172.18.36.102 applicationA application_groupA

46003 2093107 93 173

0 0 0 0

/user_groupB/user_nameB 172.18.36.102 applicationB

application_groupB

46001 2093102 193 173

0 0 0 0

7 URL

7.1 URL

7.1.1 URL

URL Uniform Resource Locator

MP3

50%

25% 50%

7.1.2 URL

7.1.2.1 URL

URL

URL URL

7.1.2.2 URL

URL URL URL URL
URL URL URL URL
URL URL

URL URL

1 URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-class** *class-name*	URL class-name URL
Step 3	Ruijie(url-cls-config)# **comment** *comment-string*	URL
Step 4	Ruijie(url-cls-config)#**end**	
Step 5	Ruijie# **show running**	

URL **no comment**

	URL URL

URL CLASSA

7.4.3 URL

Ruijie# **show url-class user-cfg** *[class-name]*	show url-class URL

URL

Ruijie#show url-class user-cfg

url-class:CLASSA

url:ietf.org

comment:comment

URL

Ruijie#show url-class user-cfg CLASSA

url-class:CLASSA

url:ietf.org

comment:comment for CLASSA

7.4.4 URL

Ruijie# **show url-class system** [**class** {**id** *class-id* | **name** *f04y[-wss*	show url-f04y[wystem URL **class** URL *class-id* id *class-name*

URL

Ruijie#show url-class system

version-1.0

2010-4-22

system-url-class-number:32

1

IT

WEB

2

(

7.4.5 URL

move: move2.com

delete: delete1.com

delete: delete2.com

url-class:

comment:

url-class: IT

comment: IT

add: add1.com

add: add2.com

move: move1.com

move: move2.com

delete: delete1.com

delete: delete2.com

2

url-class:

comment:

7.5 URL

URL

URL

URL

URL

7.5.1 URL

URL URL URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-object** *obj-name*	URL obj-name URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-object** *obj-name*	URL obj-name URL
Step 3	Ruijie(url-obj-config)# **class** *class-name*	URL URL
Step 4	Ruijie(url-obj-config)#**end**	
Step 5	Ruijie# **show running**	

URL **no class** *class-name*

1 URL URL URL
2 URL URL

URL OBJA URL

7.5.3 URL

URL URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-object** *obj-name*	URL obj-name URL
Step 3	Ruijie(url-obj-config)# **comment** *comment-string*	URL
Step 4	Ruijie(url-obj-config)#**end**	
Step 5	Ruijie# **show running**	

URL **no comment**

URL URL

URL OBJA

7.5.4 URL

Ruijie(config-if)# **show url-object** *[obj-name]*	show url-obj URL

URL

Ruijie#show url-object

url-object: (inactive)OBJA

regexp: .*ieft.*

url-class:CLASSA

comment: comment for OBJA

url-object: (active)OBJB

regexp: .*w3c.*

url-class:CLASSB

comment: comment for OBJB

active URL URL

inactive URL URL URL

7.6 URL

URL

URL

URL

7.6.1 URL

URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **url-rule audit-default-enable**	URL
Step 4	Ruijie(cont-plcy-config)#**end**	
Step 5	Ruijie# **show running**	

no url-rule audit-default-enable

URL URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **url-rule priority-swap** *rule-id1 rule-id2*	URL

7.7.2 URL

URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-audit except-regexp** *[regexp]*	regexp URL
Step 3	Ruijie(config)#**end**	

	URL jpg css js gif png swf bmp ico ng dll GIF JPG xml

7.7.4 URL

URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-audit optimize-cache** *[time]*	URL URL
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie# **show running**	

no url-audit optimize-cache

	IP time URL URL

60s

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-audit exact-filter**	
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie# **show running**	

no url-audit exact-filter

7.8 URL

URL

7.8.1 URL

7.9.1 URL

URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **url-redirect-rule** *rule-id* {{**subscriber** {*subs-name* | **any**}} | {**auth-subscriber** {*auth-subs-name* | **any** }} | **subscriber** {*subs-name* | **any**} **auth-subscriber** {*auth-subs-name* | **any** } } **time-range** {*time-name* | **any**} **from** *url_a* **to** *url_b* [**comment** *comment-string]*	URL rule-id URL 1~1000 subs-name **any** auth-subs-name any obj-name URL time-name **any** url_a url url_b url comment

7.9.2 URL

URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(cont-plcy-config)# **url-redirect-rule priority-swap** *rule-id1 rule-id2*	URL
Step 3	Ruijie(cont-plcy-config)#**end**	
Step 4	Ruijie# **show running**	

URL show running
URL show running

7.10 URL

URL referer

7.10.1 URL referer

URL referer

URL URL

7.12 URL

TOPN

URL

URL

7.12.1 TOPN

Ruijie# **show url-audit top** *n* **{recent** hours | **time-range from** yyyy mm dd hh:mm::ss **to** yyyy mm dd hh:mm:ss | **day-interval** yyyy mm dd **to** yyyy mm dd **[hour-interval** hour1 **to** hour2 **[**hour3 **to** hour4**]]} [interface** *intf-name* **| bridge** *bridge-num*] **[subscriber** *subs-name*] **[auth-subscriber** *auth-subs-name*] **[url-class** *class-name* **| url-object** *obj-name***] [host** *host-string***] [permit | deny]** [**order-by time | url-class |url | url-class | host-times]**	TOPN subs-name auth-subs-name url-class URL url-object URL host-string URL permit deny order-by

TOPN

Ruijie#show url-audit top 2 recent 24

HOST Times url-class url-objec

==========

www.ietf.org 32349 class1 obj1

Ruijie# **show url-audit stat {recent** hours | **time-range from** yyyy mm dd hh:mm::ss **to** yyyy mm dd hh:mm:ss | **day-interval** yyyy mm dd **to** yyyy mm dd **[hour-interval** hour1 **to** hour2 **[**hour3 **to** hour4**]]} [interface** *intf-name* **| bridge** *bridge-num*] **[subscriber** *subs-name]* **[auth-subscriber** *auth-subs-name*] **[url-class** *class-name* **| url-object** *obj-name***] [host** *host-string***] [permit | deny]** [**order-by time | url-class** |**url | url-class | host-times]**	URL subs-name auth-subs-name url-class URL url-object URL host-string URL permit deny order-by

2010-1-11 2010-1-17 9 ~12 13 ~18 URL

Ruijie#show url-audit stat day-interval 2010 1 11 to 2010 1 17 hour-interval 9 to 12 13 to 18 order-by subscriber

Subscriber	URL-num
USERA	30024
USERB	23990

7.12.3 URL

Ruijie# **show url-audit detail {recent** hours | **time-range from** yyyy mm dd hh:mm::ss **to** yyyy mm dd hh:mm:ss | **day-interval** yyyy mm dd **to** yyyy mm dd **[hour-interval** hour1 **to** hour2 **[**hour3 **to** hour4**]]} [interface** *intf-name* **| bridge** *bridge-num*] **[subscriber** *subs-name]* **[auth-subscriber** *auth-subs-name*] **[url-class** *class-name* **| url-object** *obj-name* | **url** *url-string* | **url-host** *host-string1***] [host** *host-string2***] [permit | deny]** [**order-by time | url-class** |**url | url-class | host-times | IP]**	URL subs-name auth-subs-name url-class URL url-object URL url-string url host-string1 host host-string2 URL permit deny order-by

URL-CLASS Access-control URL-RULE

==========

2010-1-10 19:20:02 USEA 192.168.1.100

http://www.ietf.org/

IT permit URL_RULEA

2010-1-10 19:20:00 USEB 192.168.1.101

http://www.ietf.org/

IT

8

8.1

8.1.1

bbs

WEB WEB ( )

WEB WEB WEB

8.2

8.2.1

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)#**content-object** *object-name*	

8.3

!

8.3.1

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(url-obj-config)#**end**	
Step 4	Ruijie# **show running**	

no content-policy *policy-name*

1	
2	
3	
4	_TOP_PRIORITY (_AUDIT_DEFAULT) _TOP_PRIORITY _AUDIT_DEFAULT _AUDIT_DEFAULT

8.3.2

1	show running show running
2	*new-policy-name*

8.3.4

FTP
IM
TELNET
WEB
WEB-BBS
WEB-SEARCH
WEB-MAIL
MAIL

8.3.4.1

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name

Step 3 Ruijie(cont-plcy-config)# **app-rule** *rule-id* **time-range** *time-name* **app-group** *app-group-name* **action** {**permit | deny**} [**audit**] [**vpn**] [vip] [**comment** *comment-string*]

rule-id

1~200

time-range *time-name*

app-group app-*group-name*

action {

5ž7jiG}+?&Ä

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **ftp-rule** *rule-id* **time-range** *time-name* [**direction** {**in | out | double**}] [**relation** {**and** | **or**} [**directory** *content-object-name1*] [**file-name** *content-object-name2*]] **action** {**permit | deny**} [**audit**] [**comment** *comment-string*]	rule-id 1~200 **time-range** *time-name* **direction** {**in | out | double**} **relation** relation **and** **or** **directory** *content-object-name1* **file-name** *content-object-name2* **action** {**permit | deny**} **audit** **comment** *comment-string*

8.3.4.3 IM

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **im-rule** *rule-id* **time-range** *time-name* **action** {**permit | deny**} [**audit**] [**comment** *comment-string*]	IM rule-id 1~200 **time-range** *time-name* **action** {**permit | deny**} **audit** **comment** *comment-string*

Step 4	Ruijie(cont-plcy-config)# **im-rule** *rule-id* **im-type** *im-name* [**relation** {**and** | **or**} [**account** *content-object-name1*] [**message** *content-object-name2*]]	IM rule-id 1~200 rule-id **im-type** *im-name* IM

8.3.4.4 TELNET

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **telnet-rule** *rule-id* **time-range** *time-name* **direction** {**in | out | double**} [**content** *content-object-name*] **action** {**permit | deny**} [**audit**] [**comment** *comment-string*]	rule-id 1~200 **time-range** *time-name* **direction** {**in | out | double**} **content** *content-object-name* **action** {**permit | deny**} **audit** **comment** *comment-string*
Step 4	Ruijie(cont-plcy-config)#**end**	
Step 5	Ruijie# **show running**	

no telnet-rule *rule-id*

1	rule-id	
2		
3	time-name	content-object-name

POLICYA TELNET TELNET
TELNET

8.3.4.5 WEB

POLICYA web web WEB_OBJ

8.3.4.6 WEB-BBS

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **web-bbs-rule** *rule-id* **time-range** *time-name* [**content** *content-object-name*] **action** {**permit | deny**} [**audit**] [**comment** *comment-string*]	rule-id 1~200 **time-range** *time-name* **content** *content-object-name* **action** {**permit | deny**} **audit** **comment** *comment-string*
Step 4	Ruijie(cont-plcy-config)#**end**	
Step 5	Ruijie# **show running**	

WEB-BBS **no web-bbs-rule** *rule-id* WEB-BBS

web-bbs-rule delete-all

1	rule-id	
2		
3	time-name	content-object-name

POLICYA WEB-BBS
WEB-BBS

8.3.4.7 WEB-SEARCH

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **web-search-rule** *rule-id* **time-range** *time-name* [**content** *content-object-name*] **action** {**permit | deny**} [**audit**] [**comment** *comment-string*]	rule-id 1~200 **time-range** *time-name* **content** *content-object-name* **action** {**permit | deny**} **audit** **comment** *comment-string*
Step 4	Ruijie(cont-plcy-config)#**end**	
Step 5	Ruijie# **show running**	

no web-bbs-rule *rule-id*

1	rule-id	
2		
3	time-name	content-object-name

POLICYA WEB-SEARCH
WEB-SEARCH

Step 4	Ruijie(cont-plcy-config)#**web-mail-rule** *rule-id* **relation** {**and** | **or**} [**from** *content-object-name1*] [**to** *content-object-name2*] [**subject** *content-object-name3*] [**body** *content-object-name4*] [**attachment-name** *content-object-name5*] [**mail-size** {**greater** | **greater-equal** | **less** | **less-equal**} file-size]	rule-id **relation**	1~200	rule-id

8.3.4.9 MAIL

MAIL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *policy-name*	policy-name
Step 3	Ruijie(cont-plcy-config)# **mail-rule** *rule-id* **time-range** *time-name* [**direction** {**in | out | double**}] **action** {**permit | deny**} [**audit**] [**comment** *comment-string*]	rule-id 1~200 rule-id **time-range** *time-name* **direction** {**in | out | double**} (POP3) (SMTP) **action** **action** {**permit | deny**} **comment** *comment-string*

Step 4	Ruijie(cont-plcy-config)#**mail-rule** *rule-id* **relation** {**and** | **or**} [**from** *content-object-name1*] [**to** *content-object-name2*] [**subject** *content-object-name3*] [**body** *content-object-name4*] [**attachment-name** *content-object-name5*] [**mail-size** {**greater** | **greater-equal** | **less** | **less-equal**} size]	rule-id 1~200 rule-id **relation** **and** **or** **from** **to** **subject** **body** **attachment-name** content-object-name **mail-size** **greater** **greater-equal** **less** **less-equal** size KBytes
Step 5	Ruijie(cont-plcy-config)#**end**	
Step 6	Ruijie# **show running**	

no mail-rule rule-id

1	Step 3 4 Step3 Step4 Step3 Step4 Step3
2	from to subject body attachment-name
3	rule-id
4	
5	time-name content-object-name

#

8.3.5

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **content-policy** *_AUDIT_DEFAULT*	*_AUDIT_DEFAULT*
Step 3	Ruijie(cont-plcy-config)# {**web-rule | web-bbs-rule | web-search-rule | web-mail-rule | ftp-rule | telnet-rule | im- rule | mail-rule** } **audit-default-enable**	
Step 4	Ruijie(cont-plcy-config)# **end**	
Step 5	Ruijie# **show running**	

no {web-

8.4.1

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)#**content-policy-relate relate** {**subscriber** {*subs-name1*	**any**}	**auth-subscriber** {*subs-name2*	**any**}} **policy** *policy-name*	
Step 4	Ruijie(config)#**end**	
Step 5	Ruijie# **show running**	

no content-policy-relate relate {**subscriber** {*subs-name1* | **any**} | **auth-subscriber** {*subs-name2* | **any**}} **policy** *policy-name*

1	
2	subs-name1 subs-name2
3	**subscriber** **auth-subscriber**
4	policy-name
5	

policyA user1,user2 policyA, policyB auth-user3

8.4.2

#

Ruijie(config)# end

8.6

8.6.1

Ruijie# **show content-policy** [**stat** [**policy** policy-*name*] | **policy** [*policy-name*]]	stat **policy** *name* *name*

1 POLICYA

2

3 POLICYA

8.6.2

USER1 POLICYA

8.7

FTP

IM

TELNET

WEB

WEB-BBS

WEB-SEARCH

WEB-MAIL

MAIL

8.7.1

recent

Ruijie# **show app-audit stat** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm:ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**ip** *addr*] [**app-group** *app-group-name*] [**rule-name** *rule-name*] [**permit | deny**]

==========

Time: 2010-05-03 16:45:29

subscriber: /USERA

auth-subscriber: any

Ip: 192.168.211.96

App: QQ

Rule: DenyQQ

Action: deny

8.7.2 FTP

Ruijie# **show ftp-audit detail** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* | **bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**direction** {**in** | **out**

8.7.3 IM

Ruijie# **show im-audit stat** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [

Ruijie# **show im-audit detail** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd*

==========
==========

Time: 2010-05-03 15:43:59

App-type: msn

Sender: wrh725@hotmail.com

Receiver:

Direction: in

Path: GigabitEthernet 0/5

Ip: 192.168.211.96

User: /USERA

Match-Rule:

Action:

Forward:

Message: -

8.7.4 TELNET

Timestamp Rand-

Ruijie# **show web-audit stat** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**keyword** *keyword*] [**rule-name** *rule-name*] [**ip** *ip-address*] [**permit | deny**]	WEB **recent** *hours* **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* **day-interval** **hour-interval** *hour1 hour2 hour3 hour4* **interface** *intf-name* **bridge** *bridge-num* **subscriber** *subs-name1* **auth-subscriber** *subs-name2* **keyword** *keyword* **rule-name** *rule-name* **Ip** *ip-address* ip ip **permit | deny**

Ruijie# **show web-audit detail** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**keyword** *keyword*] [**rule-name** *rule-name*] [**ip** *ip-address*] [**permit | deny**] **order-by** {**time** | **subscriber** | **internal-ip** | **url** } {**asc** | **desc**} [**start-item** *integer* **end-item** *integer*]	WEB

==========

Time: 2010-05-03 16:45:29

User: /USERA

Ip: 192.168.211.96

KeyWord:

Rule: webrule

Action:

Url:
msn.allyes.com/main/adfshow?user=MSN|Portal_all|MSN_Today_Hotlink2&db=msn&border=0&local=yes

==========

Time: 2010-05-03 16:45:21

User: /USERA

Ip: 192.168.211.96

KeyWord:

Rule: webrule

Action:

Url:
msn.allyes.com/main/adfshow?user=MSN|Portal_all|MSN_Today_Hotlink2&db=msn&border=0&local=yes

8.7.6 WEB-BBS

Ruijie# **show web-bbs-audit stat** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm:ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**ip** ip_list] [**content** *keyword*] [**rule-name** *rule-name*] [**permit | deny**]

recent *hours*
time-range from *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss*

URL

Subject

Body-path Other-path

Match-keyword Rule Action

==========

2010-10-14 11:21:21 638582850 GigabitEthernet 0/5 192.168.11.91 / USERA

tieba.baidu.com/f?kz=887028015

N/A

mnt/sata/c/web_bbs/attach/body_1287026482.html mnt/sata/c/web_bbs/attach/post_1287026482.html

N/A N/A permit

Ruijie# **show web-search-audit stat** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**ip** *addr*] [**keyword** *keyword*] [**rule-name** *rule-name*] [**permit | deny**]	WEB-SEARCH **recent** *hours* **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* **day-interval** **hour-interval** *hour1* *hour2* *hour3* *hour4* **interface** *intf-name* **bridge** *bridge-num* **subscriber** *subs-name1* **auth-subscriber** *subs-name2* **keyword** *keyword* **rule-name** *rule-name* **permit | deny**
Ruijie# **show web-search-audit detail** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**keyword** *keyword*] [**rule-name** *rule-name*] [**permit | deny**] **order-by** {**time** | **subscriber** | **internal-ip | url** } {**asc** | **desc**} [**start-item** *integer* **end-item** *integer*]	WEB-SEARCH **order-by** {**time** | **subscriber** | **auth-subscriber | internal-ip | url**} IP URL **asc** | **desc** **start-item** *integer* integer **end-item** *integer* integer

2010-10-1 2010-10-15 09 18 USERA WEB-SEARCH

Ruijie# **show web-search-audit stat day-interval** 2010 10 1 **to** 2010 10 15 **hour-interval** 9 **to** 18 **subscriber** USERA

Ruijie# 50

Ruijie# show web-search-audit detail day-interval 2010 10 1 to 2010 10 15 hour-interval 9 to 18 subscriber USERA order-by time desc start-item 1 end-item 20

Time Interface/Bridge Subscriber Internal-IP

URL

Search-Word Rule Action Match-KeyWord

2010-10-15 10:47:23 GigabitEthernet 0/5 /USERA192.168.11.91

www.baidu.com/s?bs=subway&f=8&wd=sunday
sunday default-audit permit

2010-10-15 10:46:53 GigabitEthernet 0/5 /USERA192.168.11.91

www.baidu.com/s?wd=subway&oq=subw&rsp=0&f=3&sugT=8172

subway default-audit permit

8.7.8 WEB-MAIL

	WEB-MAIL
	recent *hours*

Ruijie# **show web-mail-audit stat** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**ip** *addr*] [**direction** {**in** | **out** | **double**}] [**from** *keyword1*] [**to** *keyword2*] [**subject** *keyword3*] [**rule-name** *rule-name*] [**permit | deny**]

time

Ruijie# **show web-mail-audit detail** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**ip** *addr*] [**direction** {**in** | **out** | **double**}] [**from** *keyword1*] [**to** *keyword2*] [**subject** *keyword3*] [**rule-name** *rule-name*] [**permit | deny**] **order-by** {**time** | **subscriber** | **internal-ip** | **direction** | **send-mail-addr** | **mail-size**} {**asc** | **desc**} [**start-item** *integer* **end-item** *integer*]	MAIL **order-by** {**time** | **subscriber** | **auth-subscriber** | **internal-ip** | **direction** | **send-mail-addr** | **mail-size**} IP **asc** | **desc** **start-item** *integer* integer **end-item** *integer* integer
Ruijie#**show web-mail-audit attachment-info timestamp** *timestamp* **rand-id** *rand-id*	**timestamp** *timestamp* **rand-id** *rand-id* id

2010-5-1 2010-5-7 09 18 USERA

Ruijie# **show web-mail-audit stat day-interval** 2010 5 1 **to** 2010 5 7 **hour-interval** 9 **to** 18 **subscriber** USERA

Ruijie# 50

Ruijie# show web-mail-audit detail day-interval 2010 5 1 to 2010 5 7 hour-interval 9 to 18 subscriber USERA order-by time desc start-item 1 end-item 20

===1 0 0

Direction: out

App-Type: webmail

Send/Receive-Time:

Sender: 15483314@qq.com

Receiver: "starnet_111"<starnet_111@sina.cn>

Subject:

Mail-Size: 5562

Attach-Num: 0

Rule: webmail

Action: permit

Match-Keyword: [From][To][Subject][Body][Attachment]

Body-Path: /mnt/sata/c/webmail/3/2010-11-12-4-31-1-971142.html

url: m409.mail.qq.com/cgi-bin/compose_send

==========

timestamp

Ruijie# **show mail-audit stat** {**recent** *hours* | **time-range from** *yyyy mm dd hh:mm::ss* **to** *yyyy mm dd hh:mm:ss* | **day-interval** *yyyy mm dd* **to** *yyyy mm dd* [**hour-interval** *hour1* **to** *hour2* [*hour3* **to** *hour4*]]} [**interface** *intf-name* **| bridge** *bridge-num*] [**subscriber** *subs-name1*] [**auth-subscriber** *subs-name2*] [**ip** *addr*] [**direction** {**in** | **out** | **d**

2010-10-1 2010-10-15 09 18 USERA

Ruijie# **show mail-audit stat day-interval** 2010 10 1 **to** 2010 10 15 **hour-interval** 9 **to** 18 **subscriber** USERA

Ruijie# 50

Ruijie# show mail-audit detail day-interval 2010 10 1 to 2010 10 15 hour-interval 9 to 18 subscriber USERA order-by time desc start-item 1 end-item 20

Timestamp Rand-ID Time Subscriber Direction App-Type

Send/Receive-Time Sender Receiver

Subject Mail-Size Attach-Num

Rule Action Match-Keyword Body-Path

==========
==========

1287027112 1686175891 2010-10-14 11:31:52 /USERA out SMTP

Thu, 14 Oct 2010 11:31:33 +0800 nabi2006@126.com nabi2006@126.com baicai2010@tom.com

136282 0

default-audit permit From:,To:,Subj:,Body:,Attach: mnt/sata/c/mail/10/2010-10-14-11-31-52.html

1286849291 1087821567 2010-10-12 10:08:11 /192.168.11.91 in POP3

Fri, 3 Sep 2010 11:19:52 +0800 baicai2010@tom.com baicai2010@tom.com nabi2006@126.com

332873 2

default-audit permit From:,To:,Subj:,Body:,Attach: mnt/sata/c/mail/10/2010-10-12-10-08-12(5).html

timestamp 1286849291 **rand-id** 1087821567

Ruijie#show mail-audit attachment-info timestamp 1286849291 rand-id 1087821567

Size(Byte) Path

==========

80646 mnt/sata/c/mail/10/unknown(09-01-19-44-40).gif

150528 mnt/sata/c/mail/10/ (3).doc

1.

2.

3. DHCP

4. DHCP Relay

5. DNS

6. NTP

7. SNTP

8. UDP-Helper

9. DDNS

10. DDNS

11. DNS

1

1.1

1.1.1

OA

ERP CRM

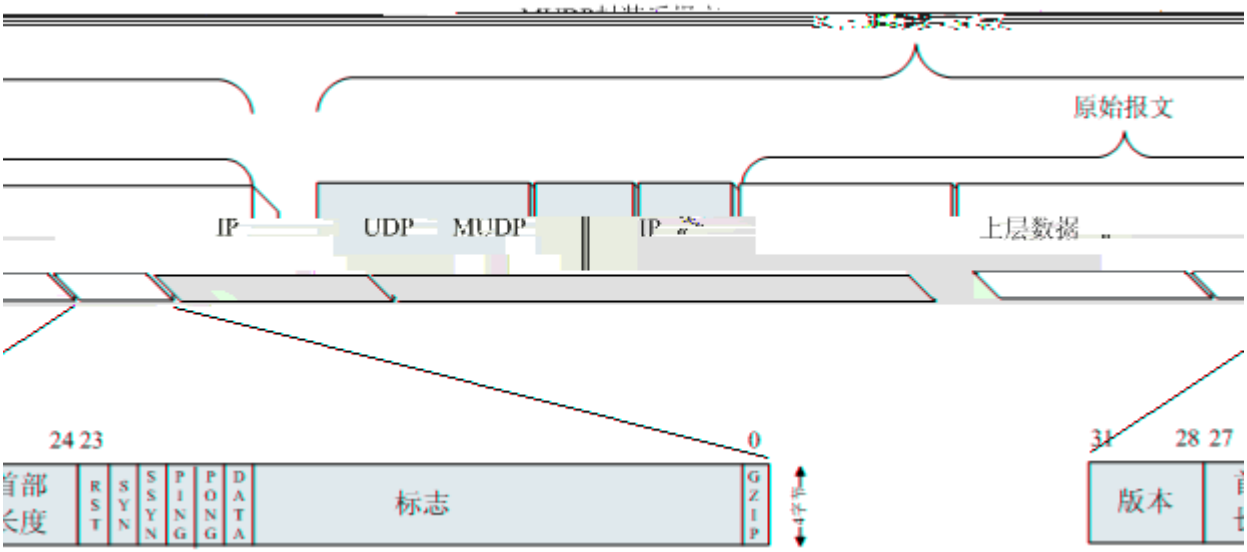
CIFS

G

QQ/MSN

VoIP Video BQQ/MSN

MUDP



MUDP

3

4 1

4 MUDP UDP

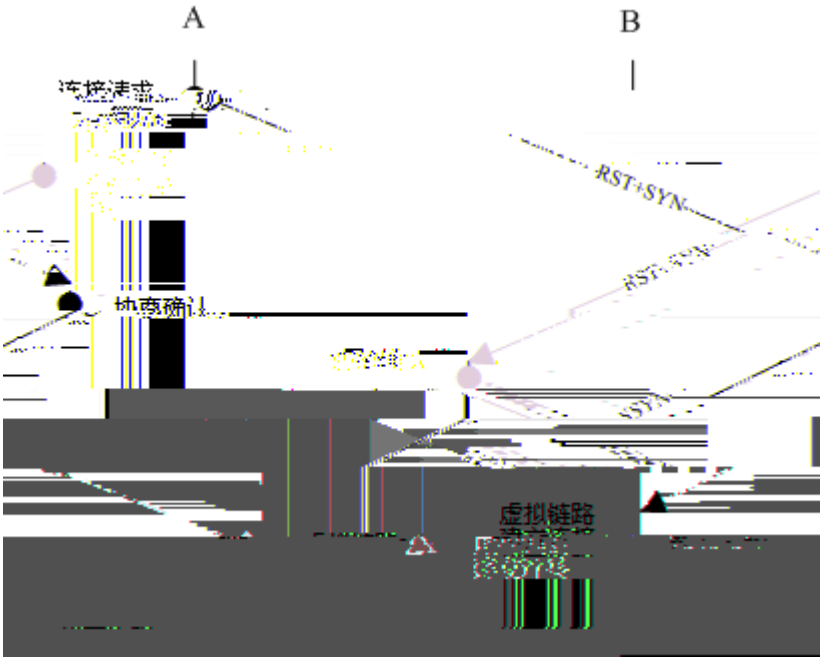
IP

56 15*4- 4

24 MUDP 23 0

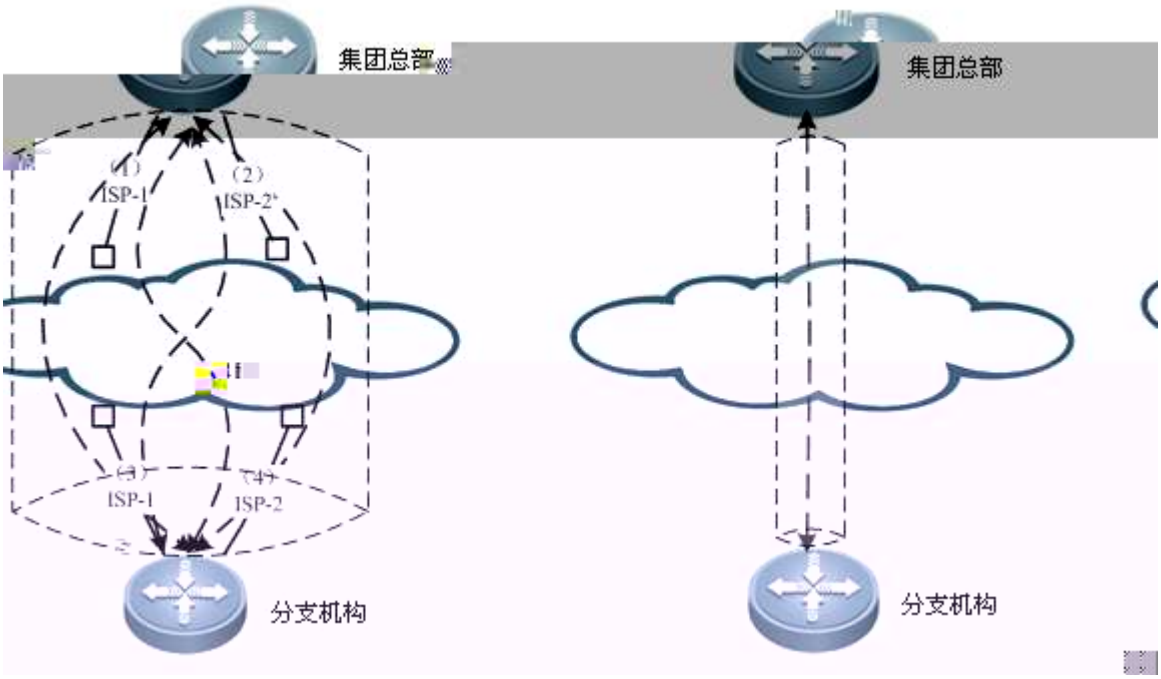
MUDP MUDP

DATA



MUDP UDP

1.1.2.2



1 2 3 4

1-3 1-4 2-3 2-4

MUDP

ACL

1.1.3

1.1.4

4

1 ACL

2
3 ACL
4 P1 P2 P3……
5

6
7
8

9

1.1.5

MUDP

1.2

	1

1.3

ACL

1.3.1

Step 1	Ruijie#**configure terminal**	
Step 2	Ruijie(config)# **vwan enable**	
Step 3	Ruijie(config)# **end**	
Step 4	Ruijie# **show run**	

1

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

Ruijie(config)# vwan enable

Ruijie(config)# end

1.3.2

1.3.3

Step 1	Ruijie#**configure terminal**	
Step 2	Ruijie(config)#**vwan channel** **active** | **passive** *channel-name*	passive
Step 3	Ruijie(config-vwan-channel)# **server** *address*	
Step 4	Ruijie(config-vwan-channel)# **end**	
Step 5	Ruijie# **show run**	

1

Ruijie#configure terminal

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

Ruijie(config)# vwan channel passive AAA //

Ruijie(vwan-channel)# server 2.2.2.2

Ruijie(vwan-channel)# server 2.2.2.3

1.3.4 ACL

Step 1	Ruijie#**configure terminal**	

1 1 ACL AAA

Ruijie#configure terminal

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

Ruijie(config)# vwan channel active AAA //

Ruijie(vwan-channel)# access-list 1 // ACL 1

1.3.5

Step 1	Ruijie#**configure terminal**	
Step 2	Ruijie(config)#**vwan channel active** | **passive** *channel-name*	
Step 3	Ruijie(config-vwan-channel)# **loss-recover enable**	**no loss-recover enable**
Step 4	Ruijie(config-vwan-channel)# **end**	
Step 5	Ruijie# **show run**	

1

Ruijie#configure terminal

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

Ruijie(config)# vwan channel active AAA //

Ruijie(vwan-channel)# loss-recover enable //

1.3.6

Step 1	Ruijie#**configure terminal**	

Step 2	Ruijie(config)#**vwan channel active** | **passive** *channel-name*	passive
Step 3	Ruijie(config-vwan-channel)# **limit** *num*	
Step 4	Ruijie(config-vwan-channel)# **end**	
Step 5	Ruijie# **show run**	

1

Ruijie#configure terminal

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

Ruijie(config)# vwan channel passive AAA //

Ruijie(vwan-channel)# limit 100 // 100

1.3.7

Step 6	Ruijie#**configure terminal**	
Step 7	Ruijie(config)#**vwan channel active** | **passive** *channel*	

1.3.8

1.3.8.1

peer_ie.

State	Free Listen Connectting Established Fault Closing
	id

id_num: 1

serv free: 128

delay_num: 0

timer_num: 0

link:

pool free: 2047, total: 2048

link_num: 1

id num: 1

intf_num: 1

listen num:0

delay_num: 0

timer_num: 1

efbuf:

free: 2048, total: 2048

blk:

free: 230021, total: 230000

1.3.8.4

show vwan stat [channel [*name* **]]**	

1

Ruijie#show vwan stat

efbuf:

nobuf : 0 alloc_buf : 0 free_buf : 0
no_reservebuf : 0

adj:

no_nexthop : 0 no_adj : 0 not_forwordadj : 0
no_src_intf : 0

fpm:

create_flow : 0 update_flow : 0 get_prispace : 0
get_flowevent : 0 used_flow : 0 other_flow : 3

mudp:

mudp_ver : 179978 mudp_len : 0 mudp_cksum : 0
mudp_synext : 0 mudp_ssynext : 0 mudp_rstext : 0

mudp_pingext : 0 mudp_pongext : 0 mudp_dataext : 0
mudp_blk : 0 move_rearvward : 0

link:

ssyn_echo : 0 unexpect_pkt : 0 unexpect_state : 0
no_link : 0

channel:

no_channel : 0 sl_notexist : 0 sl_notestabed : 0
sl_proto : 0 sl_serempty : 643 up_select : 427

down_select : 10 ch_lenlimit : 0 ch_notexist : 0
ch_notestabed : 0 encode_fail : 0 encap_data : 427

pkt_err : 0 forward_err : 0 update_head : 105588
update_order : 263975 det_fault : 0 update_quota : 1055

rs_encode : 105588

compress:

compress_err : 0 small_pkt : 0 not_tcp : 0
gzip_nobuf : 0 compr_rate : 0 mod_encp_err : 0

gzip_funcoff : 427 gzip_success : 0 ungzip_funcfail : 0
gzip_flags : 0 ungzip_fail : 0 ungzip_nobuf : 0

ungzip_success : 0

rs:

old_drop : 0 ch_notestab : 0 ring_full : 0
mss_modify : 0 nobuf : 0 coding_nobuf : 0

noblk : 0 err_blk : 0 accept : 427
forward : 9 order_lost : 1 head_lost : 1

forward_err : 0 outoforder : 1 outoforder_err : 0
order_many : 0 forward_old : 0 assem_err : 0

dup : 0 movetail : 0 movehead : 0
inv_zero : 0 recov_err : 0

rs path:

blk_1 : 427 blk_2 : 0 accept_chk : 1
tm_chk : 389 send : 1218 send_chk : 791

recv : 30 recv_chk : 20 recv_data : 10
chk_old : 0 chk_complete : 10 chk_numerr : 0

chk_first : 10 chk_infoerr : 0 chk_seqerr : 0
chk_replace : 0 chk_insert : 0 chk_full : 10

chk_notenough : 0 chk_recov : 10 chk_recov_ok : 0
recov_noblk : 0 recov_nobuf : 0 data_recov : 0

data_recov_ok : 0 data_order : 9 data_order_blk : 0
data_outoforder : 0 data_order_prev : 0 data_order_next : 0

order_noblk_2 : 0 order_assem : 0 out_notblk : 0
out_noblk_2 : 0 out_blk_2 : 0 out_nonext : 0

out_order : 0 group_prev : 0 group_next : 0
group_notorder : 0 group_sent : 0 group_assem : 0

group_direct : 0 group_order : 0 tm_order_copy : 1
tm_order_assem : 0 tm_head_freechk : 0 tm_head_freedata: 10

close_freechk : 0 close_freedata : 0 close_freebuf : 0
encode_notestab : 0

rs bytes stat:

before_rs : 25520 after_rs : 127828 recv_rs : 3100

rs encode stat:

[0]:

[1]: [2] 386

[2]:

[3]: [3] 1

[4]:

[5]:

[6]:

[7]:

[8]: [8] 1

[9]:

[10]:

[11]:

[12]:

[13]:

[14]: [4] 1

[15]:

[16]: [4] 1

2

eg1000c#show vwan stat channel

stat of channel:pyd

receive_pkt :820854 send_pkt :9664794 over ringsize :0

eg1000c#show vwan stat link

send_syn send_ssyn send_ping send_pong send_data send_rst

recv_syn recv_ssyn recv_ping recv_pong recv_data recv_rst

channel name:pyd

link id: 69fba7

1 2 490 490 24 0

1 1 490 490 18 0

1.4

1.4.1

2

2

2.1 Ping

Echo

Echo

RGOS Ping

Ping Ping

Ping

Ruijie# **ping** [*ip*] [*address* [**length** *length*] [**ntimes** *times*] [**data** *data*][**source** *source*] [**timeout** *seconds*]]	**Ping**

Ping 5 100Byte

IP 2 !

. ping

Ping Ping

TTL 1
TTL 0 TTL
Traceroute TTL 1
ICMP TTL
TTL 1 TTL
ICMP TTL
IP

Traceroute

Ruijie# **traceroute** [*protocol*] [*destination* [**probe** *probe*] [**ttl** *minimum maximum*] [**source** *source*] [**timeout** *seconds*]]	

Traceroute

1 Traceroute

IP 61.154.22.36
1 6

2 Traceroute

IP 202.108.37.42

1 17 4

3 DHCP

3.1 DHCP

DHCP(Dynamic Host Configuration Protocol) RFC 2131
DHCP DHCP Client/Server DHCP
IP

DHCP IP

1) DHCP IP

2) DHCP IP

3) IP DHCP IP

DHCP BOOTP(Bootstrap Protocol) BOOTP
BOOTP DHCP BOOTP
DHCP RFC 951 RFC 1542 DHCP

3.2 DHCP

DHCP RFC 2131 IP
DHCP

DHCP

DHCP IP

1) DHCPDISCOVER

2) DHCP DHCPOFFER IP MAC

3) DHCPREQUEST IP

4) DHCP DHCPACK

DHCP DHCP DHCPOFFER
DHCPOFFER DHCPOFFER DHCP
DHCPOFFER DHCP

DHCP DHCPREQUEST
DHCPOFFER DHCP OFFER
IP

DHCP DHCPOFFER
DHCPDECLINE

DHCP DHCPOFFER DHCP
DHCPNAK DHCP

DHCP

DHCP

3.3 DHCP

3.4 DHCP

DHCP DHCP DHCP DHCP
DHCP DHCP DHCP

IP DHCP DHCP DHCP

DHCP DHCP

service dhcp

10.1 DHCP

NetBIOS WINS

NetBIOS

3.5.3.1

Nedhcp p Tmool

Ruijie(dhcp-config)# **lease** {*days* [*hours]* [*minutes*] | **infinite**}	

3.5.3.5

WINS

3.5.4

IP MAC 1
DHCP IP MAC
2 DHCP DHCP IP
IP MAC

DHCP
IP MAC
MAC MAC
RFC 1700 —Address Resolution Protocol Parameters‖
—01‖

Ruijie(config)# **ip dhcp pool** *name*	DHCP
Ruijie(dhcp-config)# **host** *address*	IP
Ruijie(dhcp-config)# **hardware-address** *hardware-address type* Ruijie(dhcp-config)# **client-identifier** *unique-identifier*	aabb.bbbb.bb88 01aa.bbbb.bbbb.88
Ruijie(dhcp-config)# **client-name** *name*	ASCII mary mary.rg.com

3.5.5 Ping

DHCP IP Ping
( ) Ping DHCP
DHCP Ping DHCP
DHCP

Ping

Ruijie(config)# **ip dhcp ping packets** *number*	DHCP Ping 0 Ping 2

3.5.6 Ping

DHCP Ping 500 IP
Ping Ping

Ping

Ruijie(config)# **ip dhcp ping timeout** *milliseconds*	DHCP Ping 500ms

3.5.7 DHCP

DHCP IP DHCP

Ruijie(config-if)# **ip address dhcp**	DHCP IP

3.5.8 PPP DHCP

ppp DHCP IP DHCP

Ruijie(config-if)# **ip address dhcp**	DHCP IP

3.5.9 FR DHCP

FR DHCP IP DHCP

Ruijie(config-if)# **ip address dhcp**	DHCP IP

3.5.10 HDLC DHCP

HDLC DHCP IP DHCP

Ruijie(config-if)# **ip address dhcp**	DHCP IP

10.1 PPP HDLC FR dhcp
IP

3.6

3.6.1 DHCP

DHCP

1 DHCP

2 debug

3 DHCP

2 DHCP

DHCP

Ruijie# **debug ip dhcp client**

3.7.3 DHCP

GigabitEthernet 0/0 DHCP

4 DHCP Relay

4.1

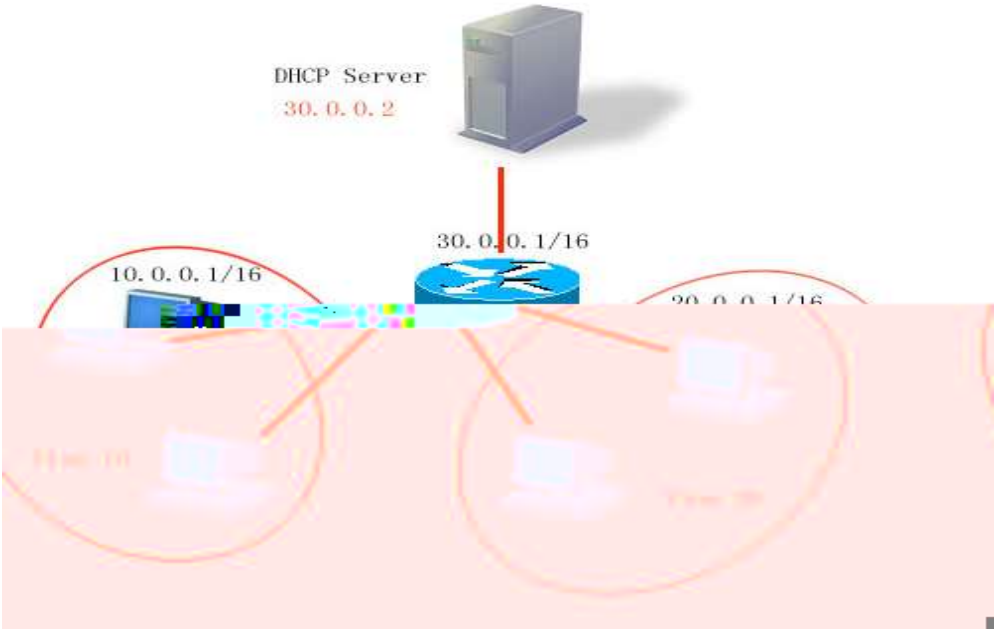
4.1.1 DHCP

DHCP IP

DHCP Client DHCP DISCOVER DHCP Server DHCP Server DHCP DISCOVER Client , IP DHCP OFFER DHCP Client DHCP OFFER DHCP REQUEST DHCP DISCOVER DHCP REQUEST IP
DHCP ACK DHCP NAK DHCP Client DHCP ACK DHCP NAK DHCP DISCOVER IP

4.1.2 DHCP DHCP Relay Agent

DHCP IP 255.255.255.255 IP DHCP Relay Agent DHCP IP DHCP Server DHCP
DHCP Client DHCP Relay Agent DHCP Client DHCP Server DHCP Server IP Client—Relay Agent—Server DHCP IP



VLAN 10 VLAN 20 10.0.0.1/16 20.0.0.1/16 DHCP Server 30.0.0.1/16 30.0.0.2 DHCP Server 10.0.0.1/16 20.0.0.1/16 IP DHCP Relay Agent DHCP Server IP 30.0.0.2

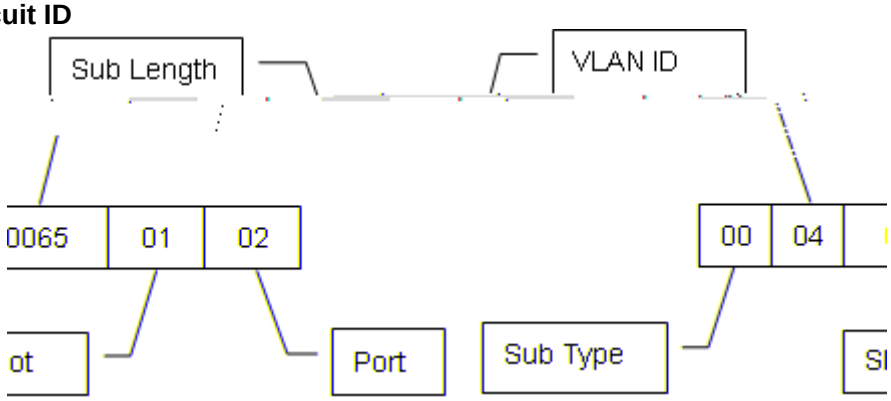
4.1.3 DHCP Relay Agent Information(option 82)

RFC3046 DHCP relay option DHCP client IP RFC3046 option 82 option82 option Circuit ID Remote ID relay agent information 802.1x/SAM relay agent information option dot1x viv11>-5<4EA92CB/F6 10.5 Tf8504. 1 245.

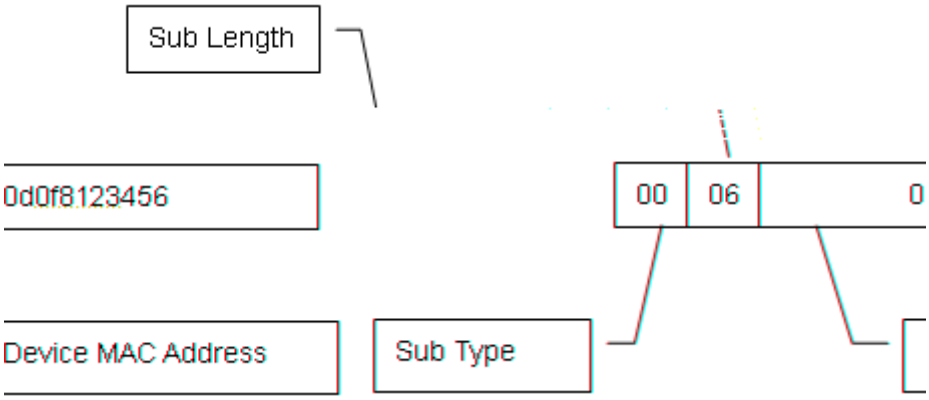
(/Sh»8(@MB3TCXEFTJBD«À6 10.5 Tf263 0402 1 75.14 3[A1Tm841F215>-303BCA047906394EA91D39>] TJ 10.5 Tf 3 0402 1 75.

2. relay agent information option82 option
DHCP relay DHCP
option82 option

Agent Circuit ID



Agent Remote ID



4.1.4 DHCP relay Check Server-id

DHCP DHCP
DHCP DHCP client
DHCP REQUEST server-id
option relay
server DHCP server
DHCP check server-id

4.2 DHCP

4.2.1 DHCP

DHCP

Ruijie (config)# **service dhcp**	DHCP

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

ACL ACL ACE ACL

4.2.5 DHCP option 82

ip dhcp relay information option82 DHCP relay
DHCP Relay Agent Information **option**

DHCP option82

Ruijie(config)# **ip dhcp relay information option82**	DHCP option82
Ruijie(config)# **no ip dhcp relay information option82**	DHCP option82

4.2.6 DHCP relay check server-id

ip dhcp relay check *server-id* DHCP relay DHCP SERVER-ID option server

DHCP relay check *server-id*

Ruijie(config)# **ip dhcp relay check server-id**	DHCP relay check server-di
Ruijie(config)# **no ip dhcp relay check server-id**	DHCP relay check server-id

4.2.7 DHCP relay suppression

ip dhcp relay suppression DHCP realy suppression DHCP relay

Ruijie(config-if)# **ip dhcp relay suppresson**	DHCP relay suppresson
Ruijie(config-if)# **no ip dhcp relay suppresson**	DHCP relay suppresson

4.2.8 DHCP

dhcp relay

// dhcp relay
//
//

4.5 DHCP

4.5.1 IP

4.5.1.1

1 IP

2 IP

4.5.1.2

4.5.1.3

DHCP Snooping DHCP Relay access Client IP

4.5.1.4

DHCP Snooping

DHCP Snooping

Gi0/2

Gi0/2 ARP

VLAN DAI

IP SVI1

10.1.0.0/16

DHCP Relay

DHCP

10.2.0.0/16

5 DNS

5.1 DNS

IP

Ruijie(config)# **ip Domain-lookup**	DNS

no ip domain-lookup DNS

5.2.3 DNS Server

DNS DNS

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

ip-address

Ruijie(config)# **ip name-server** *ip-address*	DNS Server IP DNS Server Server Server DNS 6

5.2.4 IP

IP IP

IP IP

Ruijie(config)# **ip host** *host-name ip-address*	IP

no IP

5.2.5

clear host **clear host** *

Ruijie# **clear host**

Ruijie# **show hosts**	DNS

5.2.7

Ping

6 NTP

6.1 NTP

Network Time Protocol NTP

NTP NTP
NTP

ntp authenticate	NTP
no ntp authenticate	NTP

ntp trusted-key *key-id*	NTP ID
no ntp trusted-key *key-id*	NTP ID

6.2.4 NTP

NTP 20 NTP

NTP 3 NTP
NTP

NTP

ntp server *ip-addr* [**version** *version*][**source** *if-name number*][**key** *keyid*][**prefer**]	NTP version NTP 1-3 if-name Aggregateport Dialer GigabitEthernet Loopback Multilink Null Tunnel Virtual-ppp Virtual-template Vlan keyid 1-4294967295
no ntp server *ip-addr*	NTP

6.2.5 NTP

NTP

NTP
NTP

IP

NTP

interface *interface-type number*	
ntp disable	NTP

NTP **no ntp disable**

6.2.6 NTP

no ntp NTP NTP

NTP NTP NTP NTP

NTP

NTP

NTP NTP

NTP

6.2.8 NTP

NTP

ntp update-calendar	
no ntp update-calendar	

NTP NTP

6.2.9 NTP

NTP

NTP stratum hops

1 2 1

3 2

NTP

ntp master [*stratum*]	NTP 1 15 8
no ntp master	NTP

12

ntp NTP

6.2.10 NTP

NTP NTP

NTP

NTP

ntp access-group { **peer | serve | serve-**

1

2

6.3 NTP

6.3.1 NTP

NTP

NTP

debug ntp	
no debug ntp	

6.3.2 NTP

show ntp status NTP

NTP

show ntp status	NTP

starum reference frep precision

dispersion

6.4

master NTP
key-id 6 key-string wooooop
NTP
NTP

NTP

IPv4

IPv6

7 (SNTP)

7.1

NTP Network Time Protocol--
NTP SNTP Simple Network Time Protocol

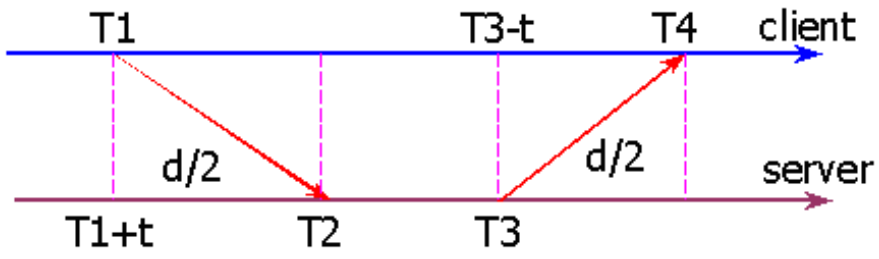
NTP
1-50 ms NTP NTP

SNTP NTP
1

SNTP NTP SNTP Client
NTP Server

7.1.1 SNTP

SNTP / GPS



Originate Timestamp	T1	time request sent by client
Receive Timestamp	T2	time request received at server
Transmit Timestamp	T3	time reply sent by server
Destination Timestamp	T4	time reply received at client

T1 ( ) Originate Timestamp

T2 ( ) Receive Timestamp

T3 ( ) Transmit Timestamp

T4 ( ) Destination Timestamp

T

d

T2 = T1 + t + d / 2;

T2 - T1 = t + d / 2;

T4 = T3 – t + d / 2;

T3 - T4 = t – d TJETBT1 0 0 1 170.9 610[(-)] TJ Tm[4

7.2.2 SNTP

SNTP

1)

2) SNTP
(5)

3)

4)

5)

SNTP **no sntp enable** SNTP

7.2.3 NTP Server

SNTP NTP SNTP Client NTP Server
NTP Server NTP
Server

NTP server http://www.time.edu.cn/ http://www.ntp.org/
192.43.244.18(time.nist.gov)

SNTP Server IP

1)

2) SNTP Server IP

3)

4)

5)

7.2.4 SNTP

SNTP Client NTP Server
NTP Server

1)

7.3 SNTP

1) SNTP

2) **show sntp**

//SNTP
//NTP Server
//
//

8 UDP-Helper

8.1 UDP-Helper

8.1.1 UDP-Helper

UDP-Helper

8.2.2 UDP-Helper

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

no udp-helper enable UDP

:

1)

2) UDP 69 53 37 137 138 49 UDP

3) DUP UDP

8.2.3

Ruijie(config-if)# **ip helper-address** *IP-Address*	UDP

no ip helper-address

Ruijie(config)# **ip forward-protocol udp** *ID*	UDP UDP UDP-Helper 69 53 37 137 138 49

no ip forward-protocol udp port UDP

:

UDP-Helper

UDP

UDP 69 53 37 137 138 49 UDP

256 UDP

ip forward-protocol udp domain ip forward-protocol udp *53*

Step 5

Ruijie#**show running**	

no peanut username

#

10 DNS

10.1 DNS

10.1.1 DNS

DNS PC DNS

10.2

DNS

DNS	
IP	

10.3 DNS

DNS

IP

10.3.1 DNS

DNS

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **smartdns enable**	DNS

Step 4	Ruijie(config)#**end**	
Step 5	Ruijie#**show running**	

DNS

11 DNS

11.1 DNS

11.1.1 DNS

DNS-Proxy DNS DNS
PC

DNS
IP IP DNS DNS
DNS IP DNS

11.1.2.2 DNS

DNS DNS
DNS DNS DNS
DNS DNS DNS DNS
DNS

DNS-Proxy DNS
IP IP DNS IP IP

1. DNS DNS any dns
dns-prxoy DNS
dns >
any dns
2.

11.3 dns-proxy

11.3.1 DNS

dns-proxy DNS

Step 1	Ruijie#**configure terminal**	
Step 2	Ruijie(config)#**intgi** 0/2	gi0/2
Step 3	Ruijie(config-if-GigabitEthernet 0/2)#**dns-proxy enable**	dns-proxy
Step 3	Ruijie(config-if-GigabitEthernet 0/2)#**no dns-proxy enable**	dns-proxy

gi0/2 dns-proxy

dns-proxy dns-proxy any dns

nat dns dns-proxy dns-proxy

nat dns ip nat application source list 1

218.85.157.99 track 1

11.3.3 dns-proxy

dns-proxy dns-proxy dns-proxy

Step 1	Ruijie#**configure terminal**	
Step 2	Ruijie(config)#**dns-proxy**	dns-proxy
Step 3	Ruijie(config-dns-proxy)#**exit**	dns-proxy

dns-proxy

#

#

Step 1	Ruijie#**configure terminal**	P

dns-proxy

11.3.8 dns

show dns-proxy name-server dns

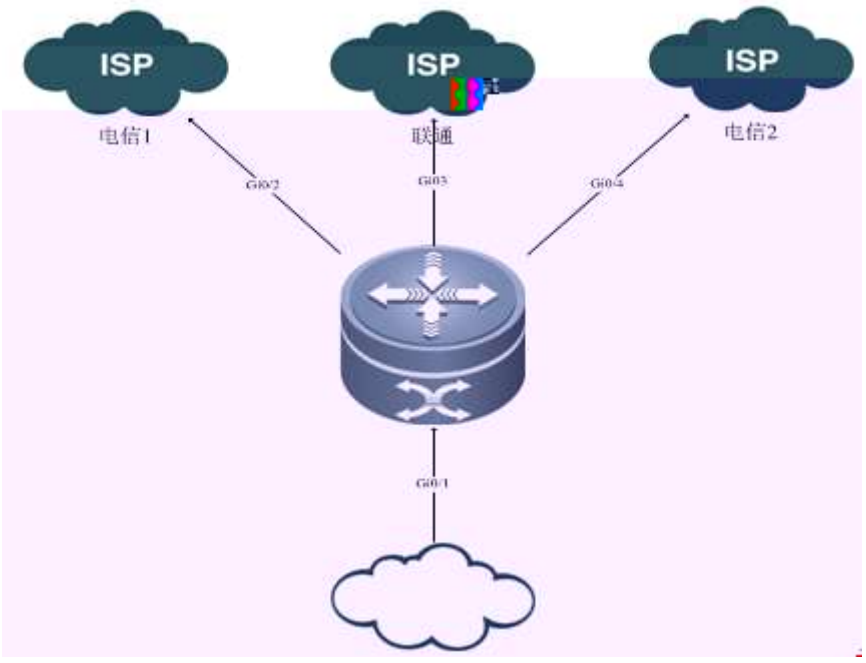
11.4 dns-proxy

11.4.1 DNS

11.4.1.1

gi0/1 1000M *gigabitEthernet 0/2*
218.85.157.5 1 100M *gigabitEthernet 0/3*
58.22.96.5 PPP 10M *gigabitEthernet 0/4*
218.85.156.5 DNS DNS 218.85.157.99 DNS
218.85.152.99 DNS DNS 58.22.96.66 DNS
218.104.128.106

11.4.1.2



dns

11.4.1.3

dns-proxy dns-proxy dns-proxy
DNS LAN gi0/1

dns-proxy DNS dns-proxy dns
gi0/4 DNS gi0/2 DNS gi0/3
DNS

DNS-Proxy DNS-Proxy

11.4.1.4

gi0/1

Ruijie#configure terminal

Ruijie(config)#**int gi0/1**

Ruijie(config-if-GigabitEthernet 0/1)#**dns-proxy enable**

Ruijie(config-if-GigabitEthernet 0/1)#exit

gi0/2 gi0/3,gi/4 dns server track

Ruijie(config)#int gi0/2

Ruijie(config-if-GigabitEthernet 0/2)#**ip name-server** 218.85.157.99 **track** 1

Ruijie(config-if-GigabitEthernet 0/2)#**ip name-server** 218.85.152.99 **track** 2

Ruijie(config-if-GigabitEthernet 0/2)#exit

Ruijie(config)#int gi0/3

Ruijie(config-if-GigabitEthernet 0/3)#**ip name-server** 58.22.96.66 **track** 3

Ruijie(config-if-GigabitEthernet 0/3)#**ip name-server** 218.104.128.106 **track** 4

Ruijie(config-if-GigabitEthernet 0/3)#exit

Ruijie(config)#int gi0/4

Ruijie(config-if-GigabitEthernet 0/4)#**ip name-server** 218.85.157.99 **track** 5

Ruijie(config-if-GigabitEthernet 0/4)#**ip name-server** 218.85.152.99 **track** 6

Ruijie(config-if-GigabitEthernet 0/4)#exit

rns dns server track

Ruijie(config)#ip **rns** 1

Ruijie(config-ip-rns)#**icmp-echo** 218.85.157.99

Ruijie(config-ip-rns)#exit

Ruijie(config)#**track** 1 **rns** 1

Ruijie(config-track)#exit

Ruijie(config)#ip **rns** 2

Ruijie(config-ip-rns)#**icmp-echo** 218.85.152.99

Ruijie(config-ip-rns)#exit

Ruijie(config)#**track** 2 **rns** 2

Ruijie(config-track)#exit

Ruijie(config)#ip **rns** 3

Ruijie(config-ip-rns)#**icmp-echo** 58.22.96.66

Ruijie(config-ip-rns)#exit

Ruijie(config)#**track** 3 **rns** 3

Ruijie(config-track)#exit

Ruijie(config)#ip **rns** 4

Ruijie(config-ip-rns)#**icmp-echo** 218.104.128.106

Ruijie(config-ip-rns)#exit

Ruijie(config)#**track** 4 **rns** 4

Ruijie(config-track)#exit

Ruijie(config)#ip **rns** 5

Ruijie(config-ip-rns)#**icmp-echo** 218.85.157.99

Ruijie(config-ip-rns)#exit

Ruijie(config)#**track** 5 **rns** 5

Ruijie(config-track)#exit

Ruijie(config)#ip **rns** 6

Ruijie(config-ip-rns)#**icmp-echo** 218.85.152.99

Ruijie(config-ip-rns)#exit

Ruijie(config)#**track** 6 **rns** 6

Ruijie(config-track)#exit

dns-proxy

Ruijie(config)#**dns-proxy**

dns

Ruijie(config-dns-proxy)#**whitelist** name-server 192.168.58.110

Ruijie(config-dns-proxy)#**exit**

gi0/2 gi0/3

Router(config-if-GigabitEthernet 0/2)# nexthop 218.85.157.5

Router(config-if-GigabitEthernet 0/2)# exit

Router(config-if-GigabitEthernet 0/3)# nexthop 58.22.96.5

Router(config-if-GigabitEthernet 0/3)# exit

gi0/2 gi0/3

Ruijie(config)# route-auto-choose cnii gigabitEthernet 0/2 218.85.157.5

Ruijie(config)# route-auto-choose cnc gigabitEthernet 0/3 58.22.96.5

11.4.1.5

show dns-proxy configure

rns	track	TRACK&RNS

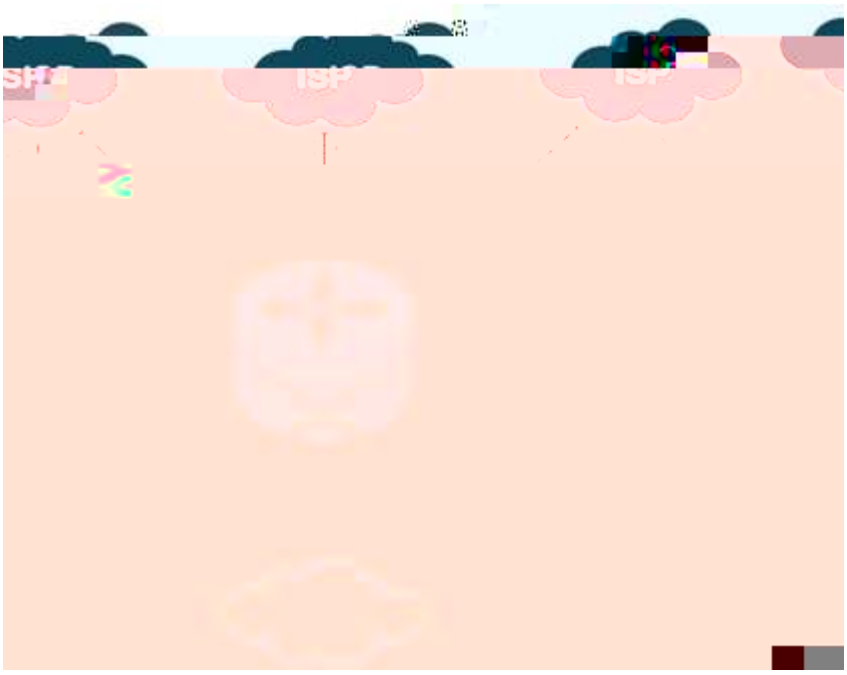
show dns-proxy name-server dns

11.4.2 dns

11.4.2.1

gi0/1 1000M *gigabitEthernet 0/2* 1 100M *gigabitEthernet 0/3* PPP 10M *gigabitEthernet 0/4* DNS DNS 218.85.157.99 DNS 218.85.152.99 DNS DNS 58.22.96.66 DNS 218.104.128.106

11.4.2.2



dns

11.4.2.3

DNS DNS dns

11.4.2.4

dns-proxy dns

1.

2.

3. RIP

4. OSPF

5.

1

IP

1

:

1.

Ruijie(config)# **route-map** *route-map-name* [**permit** | **deny**] *sequence*	

Ruijie

Ruijie(config-route-map)# **set default interface** *intf_name*	
Ruijie(config-route-map)# **set ip precedence**	IP
Ruijie(config-route-map)# **set ip tos**	IP TOS
Ruijie(config-route-map)# **set ip dscp**	IP DSCP

4.

, :

Ruijie(config-if)# **ip policy route-map** *name*	route-map
Ruijie(config-if)# **no ip policy route-map**	route-map

5.

Ruijie(config)# **ip local policy route-map** [*name*]	route-map
Ruijie(config)# **no ip local policy route-map**	

:

GigabitEthernet 0/0 , 192.168.5.5

Ruijie(config)# **ip policy** {**load-balance**	**Redundance**}	
Ruijie(config)# **no ip policy**	

WCMP(Weighted Cost Multiple Path) 4 ECMP(Equal Cost Multiple Path) 32

WCMP 4 ECMP 32

route-map

1. **ip policy route-map**
2. **ip local policy route-map**
3. **match ip address**
4. **match length**
5. **set ip next-hop**
6. **set ip default next-hop**
7. **set interface**
8. **set default interface**
9. **set ip tos**
10. **set ip precedence**
11. **set ip dscp**

2

2.1

2.1.1

2.1.2

ISP

IP

IP IP

	1
	2 gigabitEthernet 0/1 gigabitEthernet 0/2

2.2

2.3

2.3.1

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

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

#

2.3.2

#

RIP

RIP VRF ( )

IP “ ”

3.2.1 RIP

RIP RIP RIP

RIP

Ruijie(config)# **router rip**	RIP
Ruijie(config-router)# **network** *network-number wildcard*	

network-number *wildcard*

RIP

wildcard RGOS

RIP

network

1 RIP

2 RIP

3.2.2 RIP

RIP RIP

RIP

RIP RIP

Ruijie(conf-router)# **neighbor** *ip-address*	RIP

RIP

passive-interface

“ ”

FR X.25 Broadcast **neighbor Neighbor**

3.2.3

IP

X.25

IP

Ruijie(config-if)# **no ip split-horizon**	
Ruijie(config-if)# **ip split-horizon**	

Ruijie(config-if)# **ip rip receive version 1**	RIPv1
Ruijie(config-if)# **ip rip receive version 2**	RIPv2
Ruijie(config-if)# **ip rip receive version 1 2**	RIPv1 RIPv2

3.2.5

RIP RIPv2

RIPv1

RIPv2

RIP

RIP

z

RIP

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

Ruijie(config-if)# **ip summary-address rip** *ip-address ip-network-mask*	

Ruijie(config-router)# **no validate-update-source**	
Ruijie(config-router)# **validate-update-source**	

3.2.9 RIP

RIP RIP RIP

RIP

RIP

Ruijie(config-router)# **passive-interface** {**default** | *interface-type interface-num*}	
Ruijie(config-router)#**no passive-interface** {**default** | *interface-type interface-num*}	

RIP RIP

RIP

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

RIP

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

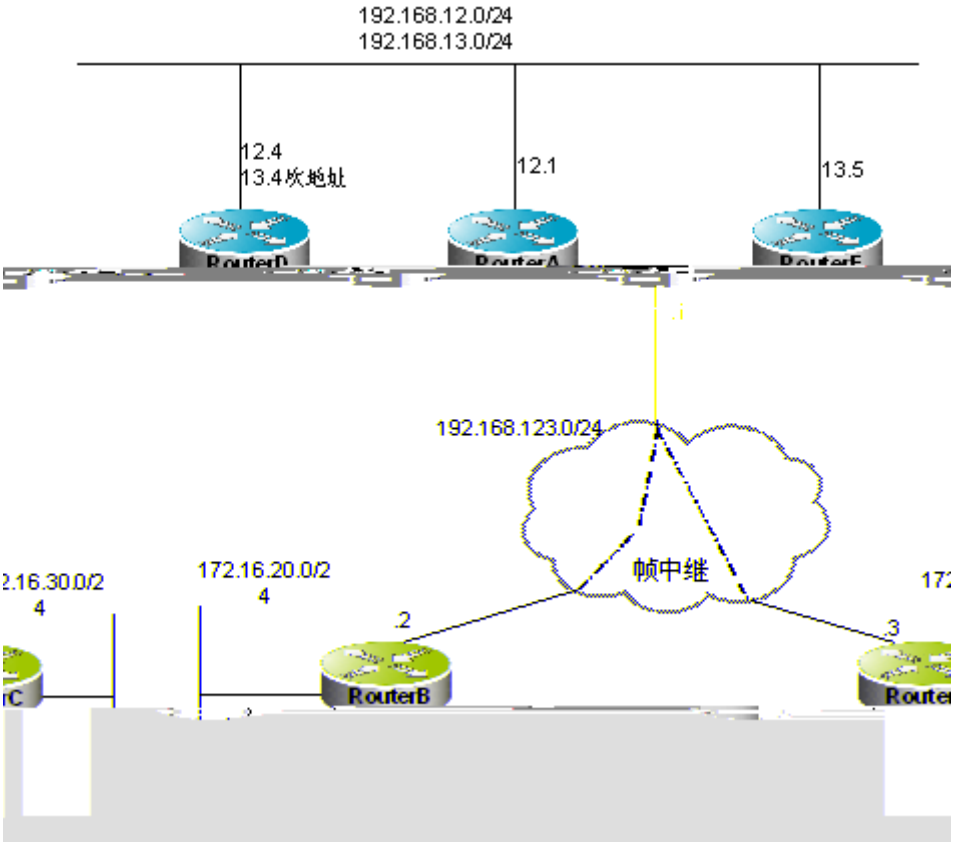
3.2.10 RIP

0.0.0.0/0 ,

Ruijie(config-if)# **ip rip default-information originate** [**metric** *metric-value*]	
Ruijie(config-if)# **no ip rip default-information**	

3.3.1 RIP

RouterA RouterD RouterE RouterA RouterB RouterC IP RouterD



RIP

1 RIP

2 RouterB RouterC 3 RouterE 192.168.12.0/24

RIP

B

#

#

RIP

C

#

#

RIP

D

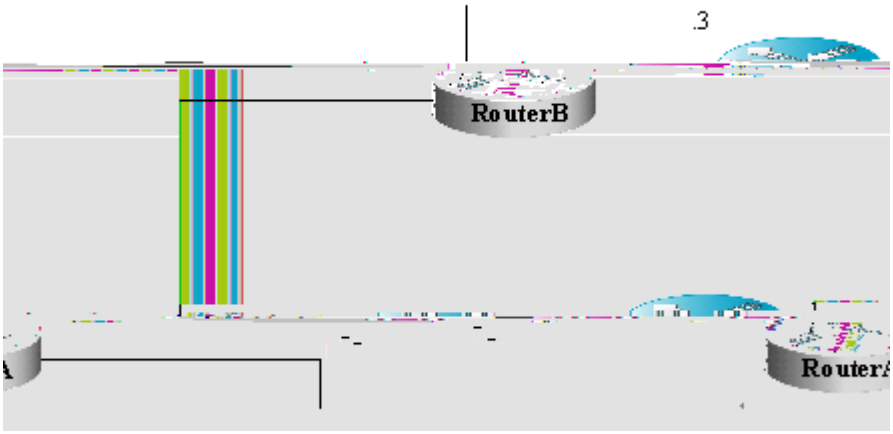
#

RIP

RIP

3.3.2 RIP

RIP MD5 IP



RIP

Router A RIP Keya Keya Keyb RIP Router B RIP Keyb Keya Keyb RIP

A

#

#

RIP

B :

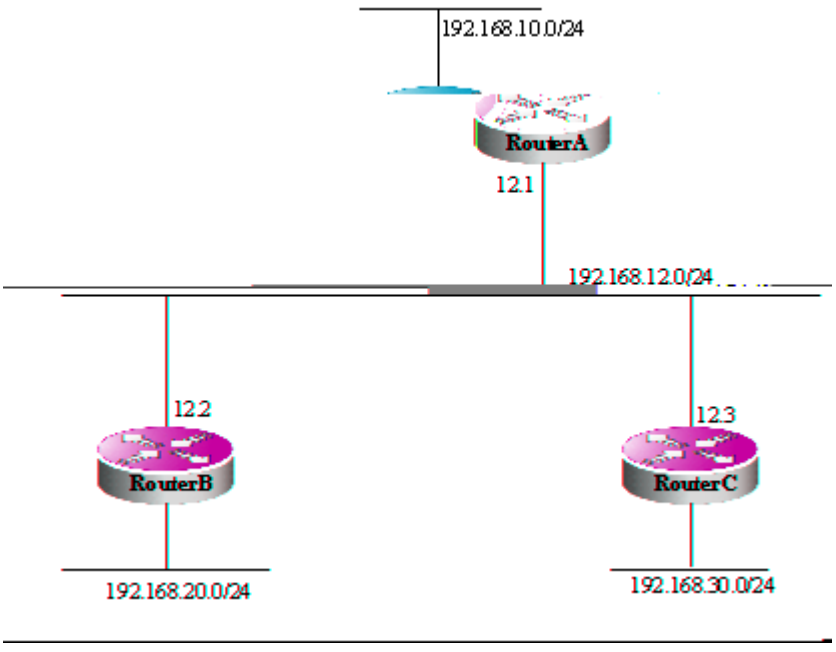
#

#

RIP

3.3.3 RIP

RIP IP



RIP

RIP

1 Router A Router C

2 Router C Router A

A RIP

A

#

#

RIP

3.3.4 RIP VRF

4 OSPF

4.1 OSPF

OSPF Open Shortest Path First IETF OSPF
OSPF IP IP 89
OSPF 224.0.0.5 OSPF 224.0.0.6

RIP OSPF RIP
OSPF VLSMs( )
RIPv2 RIP
1 2 16 OSPF
RIP IGP

OSPF

Dijkstra
IP

OSPF OSPF
Dijkstra

OSPF OSPF
IGP
BGP IGP

OSPF OSPF AREA

OSPF

1)

2) ABR Area Border Routers ,

1) OSPF 64 OSPF

2) VRF VRF OSPF

3) ——

4) —— RIP BGP

5) —— MD5

6) ——

7) VLSMs

8)

9) NSSA Not So Stubby Area RFC 3101

10) Graceful Restart RFC 3623

1) OSPF RFC 1793

2) OSPF

4.2 OSPF

OSPF

OSPF OSPF
OSPF

OSPF (
OSPF
OSPF
OSPF
OSPF NSSA
OSPF

Loopback

MTU

OSPF

OS

ID	, ospf
(summary-address)	
	240
	SPF : 5 . : 10 .
	RFC1583
OSPF	OVERFLOW GR restarter GR helper

no router ospf *process-id* OSPF OSPF

4.2.2 OSPF

OSPF

ip ospf hello-interval, ip ospf dead-interval, ip ospf authentication ip ospf authentication-key ip ospf message-digest-key

OSPF

Ruijie # **configure terminal**	
Ruijie (config)# **ip routing**	( )
Ruijie (config)# **interface** *interface-id*	
Ruijie (config-if)# **ip ospf cost** *cost-value*	
Ruijie (config-if)# **ip ospf retransmit[B(on)-5(f)7(ig)] T1122 ((Q))]c<**	

Ruijie (config-if)# **end**	
Ruijie # **show ip ospf** [*process-id*] **interface** [*interface-id*]	
Ruijie # **write**	

no

4.2.3 OSPF

OSPF

FDDI

X.25

HDLC PPP

FULL

4.2.3.1

X.25
OSPF

neighbor

Ruijie(config-if)# **ip ospf network point-to-multipoint**	
Ruijie(config-if)# **exit**	
Ruijie(config)# **router ospf** *1*	
Ruijie(config-router)# **neighbor ip-address cost** *cost*	

OSPF X.25

4.2.3.2

ospf NBMA
ospf

NBMA

1.
2. NBMA
NBMA

NBMA :

Ruijie (config-if)# **ip ospf network non-broadcast**	NBMA
Ruijie (config-if)# **exit**	
Ruijie (config)# **router ospf** *1*	
Ruijie(config-router)# **neighbor** *ip-address* [*priority number*] [*poll-interval seconds*]	, hello

ospf

ip ospf cost . ,
neighbor ,

,

Ruijie (config-if)# **ip ospf network point-to-multipoint non-broadcast**	
Ruijie (config-if)# **exit**	
Ruijie (config)# **router ospf** *1*	
Ruijie(config-router)# **neighbor** *ip-address* [*cost number*]	,

4 ip ospf cost

4.2.3.3

OSPF DR,Designated Router BDR Backup Designated Router

OSPF

OSPF HELLO

:

Ruijie (config-if)#**ip ospf network broadcast**	

Ruijie (config-if)#**ip ospf priority** *priority*	

4.2.4 OSPF

OSPF OSPF

Stub Area 1

2 3

Ruijie (config-router)# **area** *area-id* **range** *ip-address mask* [**advertise**	**not-advertise**] [**cost** *cost*]	

4.2.6.2

OSPF

OSPF

Ruijie (config-router)# **summary-address** *ip-address mask* {**not-advertise	tag** *tag-id*]	

4.2.6.3

ABR ASBR discard

discard

ABR ABR
Stub Area NSSA ABR
, ABR
router-id
Transit Area
( )

hello-interval,dead-interval

“ ” ABR OSPF

4.2.9 Loopback

OSPF IP IP
,OSPF

Loopback Loopback IP
Loopback IP Loopback

Loopback

Ruijie (config)# **interface loopback** *1*	Loopback
Ruijie (config-if)# **ip address** *ip-address mask*	Loopback IP

OSPF IP loopback
OSPF

4.2.10 OSPF

4.2.11

OSPF SPF

SPF

OSPF

Ruijie (config-router)# **timers spf** *spf-delay spf-holdtime*	

4.2.12

LSA (LSA age) LSA LSA

CPU CPU LSA

4

LSA 10000 LSA

40~100 10~20

Ruijie # **configure terminal**	
Ruijie (config)# **router ospf** *1*	OSPF OSPF
Ruijie (config-router)# **timers lsa-group-pacing** *seconds*	
Ruijie (config-router)# **end**	
Ruijie # **show running-config**	
Ruijie # **write**	

no timers lsa-group-pacing

4.2.13 OSPF

OSPF Cost Cost

OSPF

ip ospf cost

100Mbps

10Mbps 100/10 + 0.5 ≈ 10

OSPF

no passive-interface *interface-id* default

4.2.16 OSPF

OSPF OVERFLOW OVERFLOW OSPF

LSA LSA LSA LSA

LSA

LSA LSA

4.2.17 OSPF

4.2.17.1 OSPFv2 MIB

OSPFv2 MIB OSPFv2 SNMP OSPFv2
OSPFv2 MIB OSPFv2

SNMP OSPFv2 OSPFv2
MIB

Ruijie (config-router)#**enable mib-binding**	OSPFv2 MIB OSPFv2

4.2.17.2 OSPFv2 TRAP

OSPFv2 TRAP OSPFv2
OSPFv2 TRAP OSPFv2 MIB TRAP

B

OSPF

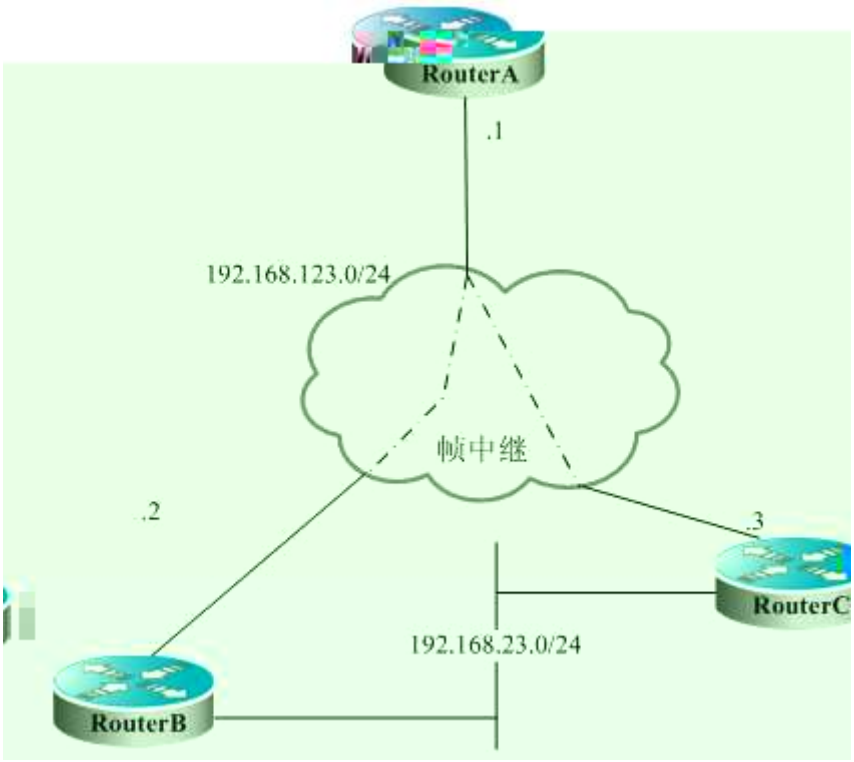
C

OSPF

4.4.2 OSPF

PVC

IP



OSPF

1 A B C

OSPF

A

OSPF

B

OSPF

C

OSPF

:

A 192.168.23.0/24 B

.

A :

4.4.3 OSPF

OSPF MD5 IP

OSPF

OSPF

1

2

A

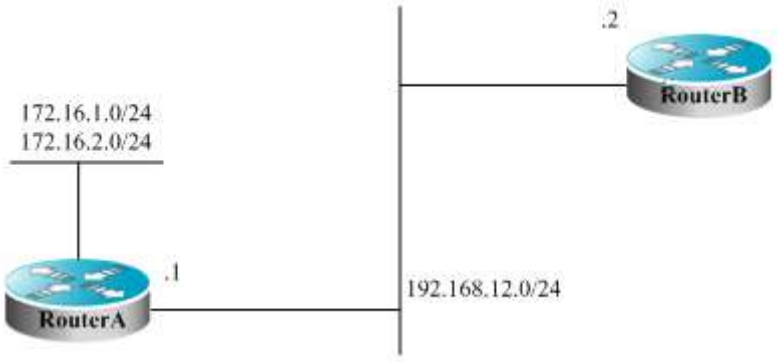
OSPF

B

OSPF

4.4.4 OSPF

IP



OSPF

1 OSPF 192.168.12.0/24 0 172.16.1.0/24

172.16.2.0/24 10

2 Router A A 172.16.0.0/22 172.16.1.0/24 172.16.2.0/24

3 Router A A 20 discard

Router A OSPF

A

2

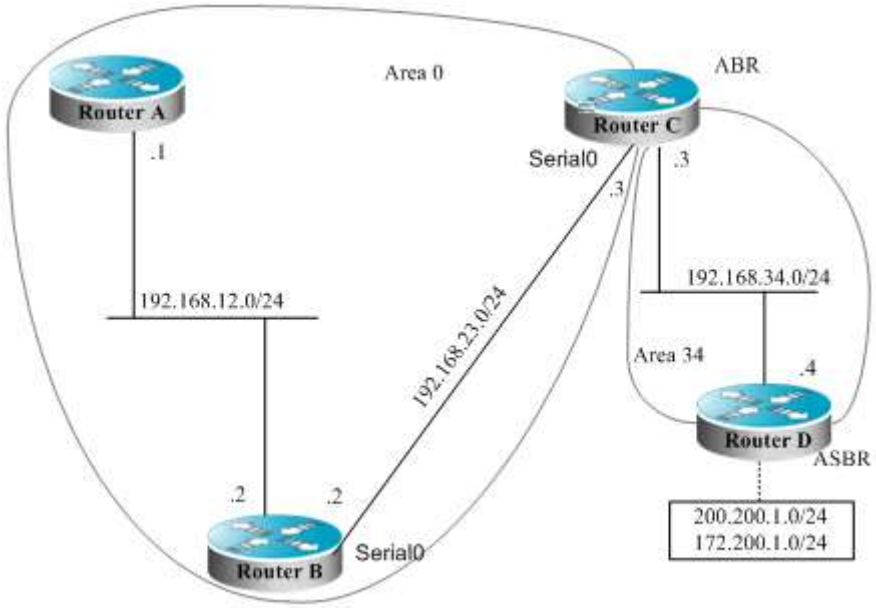
OSPF

B

OSPF

4.4.5 OSPF ABR ASBR

OSPF 192.168.12.0/24 192.168.23.0/24 0 192.168.34.0/24 34 IP



OSPF ABR ASBR

A B C D

200.200.1.0/24 172.200.1.0/24 OSPF OSPF

, “34” I

OSPF II

A

OSPF

B

OSPF

OSPF

D

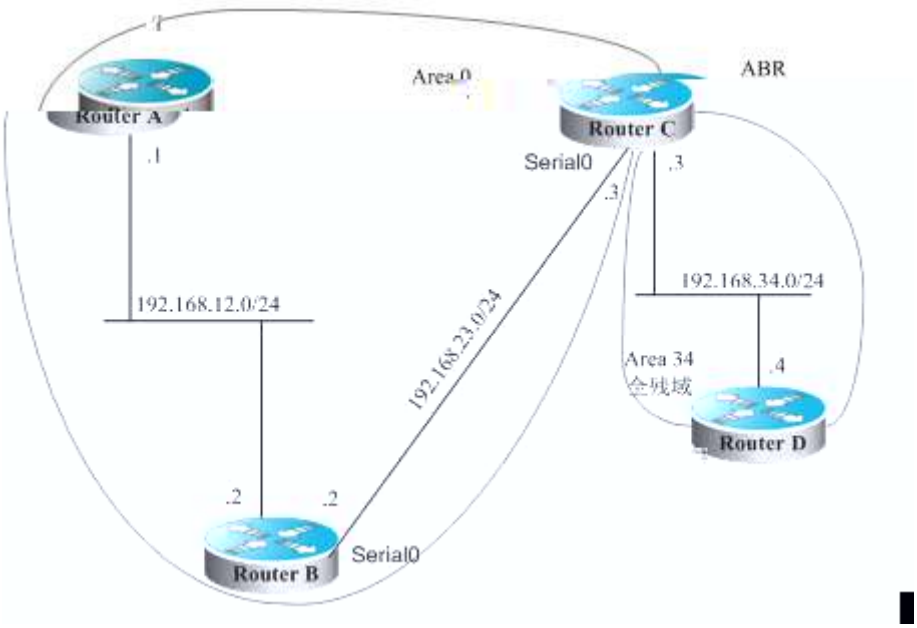
OSPF RIP

RIP

B ospf E1

4.4.6 OSPF

OSPF 192.168.12.0/24 192.168.23.0/24 0
192.168.34.0/24 34 IP



OSPF

RouterD OSPF

D C

192.168.30.0/24

A

OSPF

B

OSPF

C

OSPF

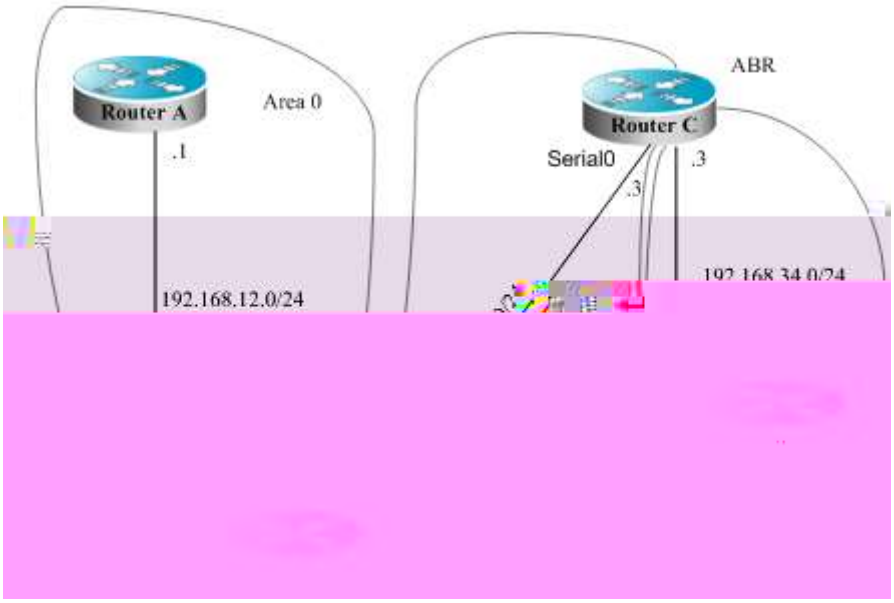
D

OSPF

D ospf

4.4.7 OSPF

OSPF 192.168.12.0/24 0 192.168.23.0/24
23 192.168.34.0/24 34 IP



OSPF

D 192.168.12.0/24 192.168.23.0/24

OSPF area 0

ABR

A

OSPF

B

IP OSPF

OSPF

RIP OSPF

down

VRF VRF VRF
VRF VRF

1 **show ip route weight**
weight WCMP
weight
WCMP 32
WCMP

WCMP
WCMP 8

1000

ip route 20.0.0.0 255.0.0.0 10.0.0.2

ip route 20.0.0.0 255.0.0.0 Loopback 1 100

ip route 20.0.0.0 255.0.0.0 Loopback 1 10.0.0.2 200

/ / /

5.1.2

1

2

RIP RIP RIP

0.0.0.0 OSPF OSPF

Ruijie(config)# **ip default-network** network	
Ruijie(config)# **no ip default-network** network	

default-network

RIP RIP

0.0.0.0/0

show ip route

5.1.3

no

ipv4 ipv6 ipv4
ipv6

maximum-paths [*number*]	32

5.2

(**route-map**)

Ruijie(config-route-map)# **match ip next-hop** *access-list-number* [*-list-number*]	
Ruijie(config-route-map)# **match ip route-source** *access-list-number* [*-list-number*]	
Ruijie(config-route-map)# **match ipv6 address** { *access-list-name* | **prefix-list** *prefix-list-name* }	IPv6
Ruijie(config-route-map)# **match ipv6 next-hop** { *access-list-name* | **prefix-list** *prefix-list-name* }	
Ruijie(config-route-map)# **match ipv6 route-source** { *access-list-name* | **prefix-list** *prefix-list-name* }	
Ruijie(config-route-map)# **match metric** *Metric*	*Metric* 0-4294967295
Ruijie(config-route-map)# **match origin** {**egp** | **igp** | **incomplete**}	
Ruijie(config-route-map)# **match route-type** {**local** | **internal** | **external** [**level-1** | **level-2**]}	
Ruijie(config-route-map)# **match tag** *tag*	*tag* 0-4294967295

Ruijie(config-route-map)# **set aggregator as** *as-num ip_addr*	AS
Ruijie(config-route-map)# **set as-path prepend** *as-number*	AS_PATH

Ruijie(config-route-map)# **set .18re.5 Tm..2 ETQ**

Ruijie(config-route-map)# **set ip next-hop** *ip-address*	IP
Ruijie(config-route-map)# **set ip next-hop verify-availability** *ip-address*	

5.3

5.3.1

OSPF RIP
RIP OSPF
IP

route maps

Ruijie(config-router)# **redistribute** *protocol [process-id]* [**metric** *metric*] [**metric-type** *metric-type*] [**match internal** | **external** *type* | **nssa-external** *type*] [**tag** *tag*] [**route-map** *route-map-*	

Ruijie(config-router)# **default-information**
originate [**always**] [**metric** *metric*]
[**metric-**

5.3.3.2

OSPF

RIP OSPF 10 OSPF
10

RIP

#

OSPF RIP

#

OSPF

5.4.2

RIP 3 RIP
172.16.1.0/24 192.168.1.0/24

RIP
RIP
172.16.1.0/24 RIP
172.16.0.0/16

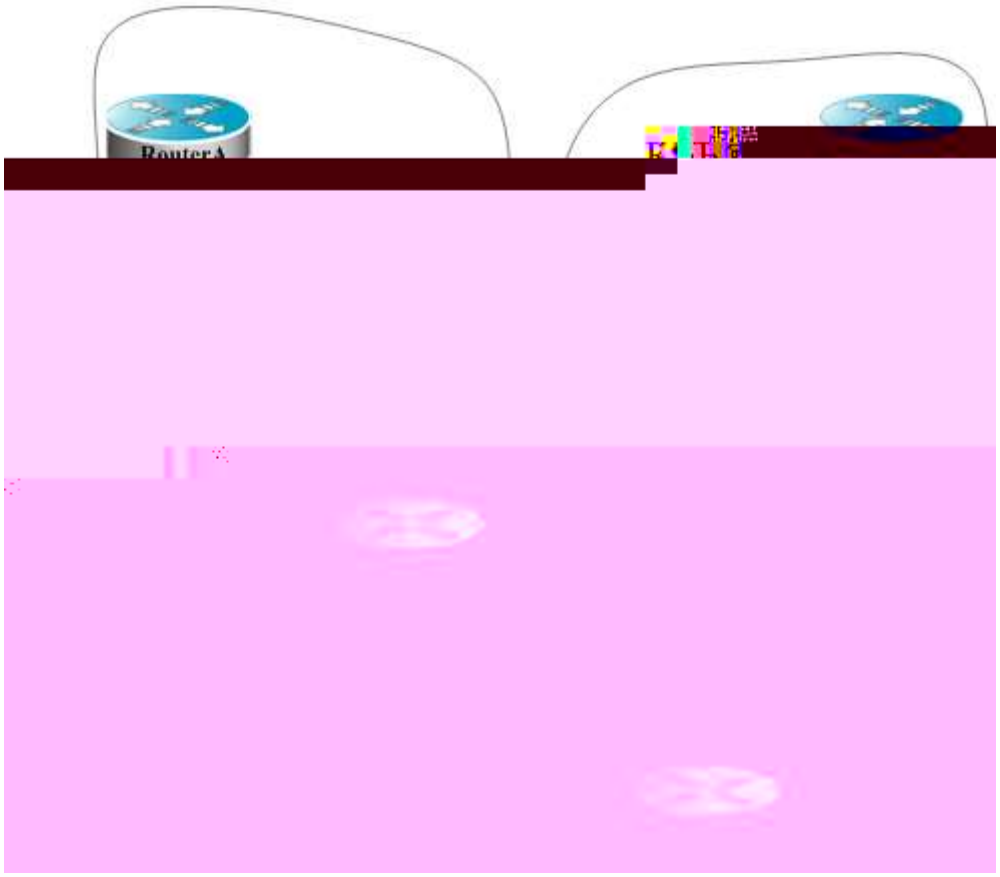
#

RIP

ACL

5.4.3

A OSPF C RIP
D BGP B A 192.168.10.0/24
192.168.100.1/32 C 192.168.3.0/24 192.168.30.0/24
D 192.168.4.0/24 FJz 40.0/24



Router B OSPF RIP Type-1 BGP
11:11 BGP RIP OSPF 192.168.10.0/24
3 RIP

BGP

A

#

#

2

B

#

OSPF

RIP

Ruijieconfig

#

D

#

Ruijie(config 2

1.
2. RPL
3.
4.
5.
6. VPDN
7. PPTP
8. L2TP
9. GRE
10. IPSec
11.
12. AAA
13. RADIUS
14. TACACS+
15. Web

1

1.1

1.1.1

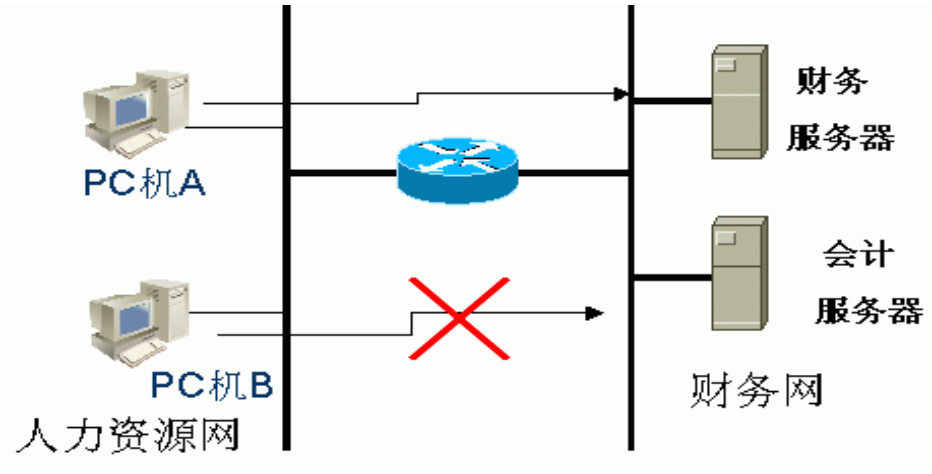
ACLs (Access Control Lists) Access Lists
ACLs
ACLs QoS ACLs

ACLs
(Conditions) (Permit) (Deny)
ACLs Qos

ACLs (Access Control Entry ACE)

1.1.2

WWW TELNET



1.1.3

IPSEC

INTERNET

.

1.1.4 / ACL

ACL ACL ACE
ACL ACL ACE

ACE ACE (Permit Deny) ACL ACE

(Layer 2 Fields)

48 MAC (48)

48 MAC (48)

16

(Layer 3 Fields)

IP (IP)

IP (IP)

(Layer 4 Fields)

TCP

UDP

ACE

ACE IP

ACE IP

UDP ACE

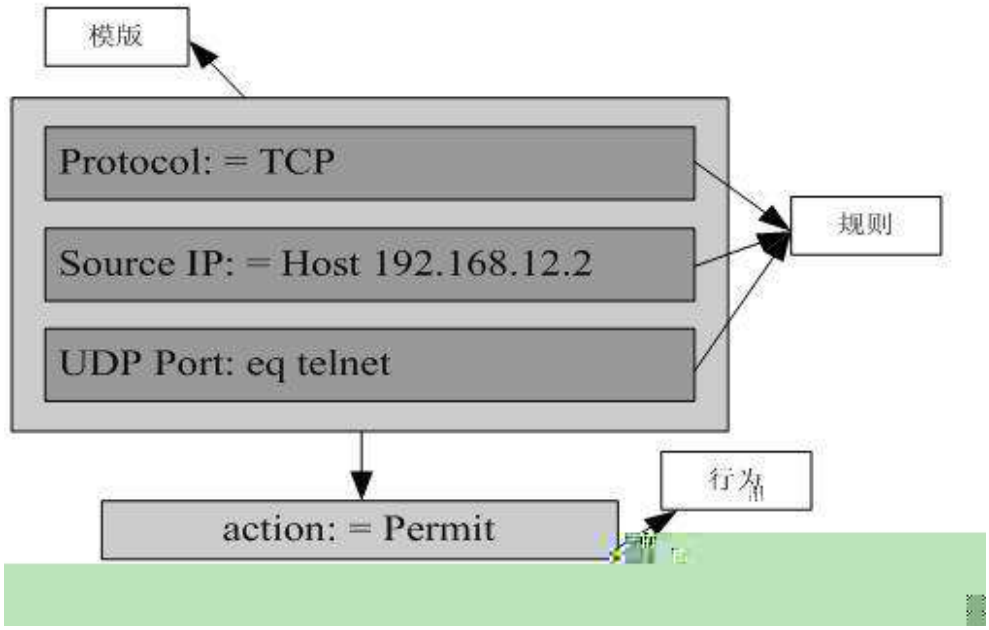
(Rules) ACE ACE

permit tcp host *192.168.12.2* **any eq telnet**

ACE IP IP TCP

(Rules) IP Host 192.168.12.2 IP TCP TCP

Telnet



ACE permit tcp host 192.168.12.2 any eq telnet

(Layer 3 Field) (Layer 4 Field)

(Layer 2 Field) ACL

1.2 IP

IP	1-99 1300 - 1999
IP	100-199 2000 - 2699

1.2.1 IP

IP 1 - 99 1300 - 1999 IP
IP 100 – 199 2000 - 2699

1.2.1.1

— Ⅱ

access-list 1 **permit host** 192.168.4.12

192.168.4.12
access-list 1 deny any

Access-list 1 **deny host** 192.168.4.12

1. — Ⅱ

1.2.1.2

access-list 101 **deny ip any any**

access-

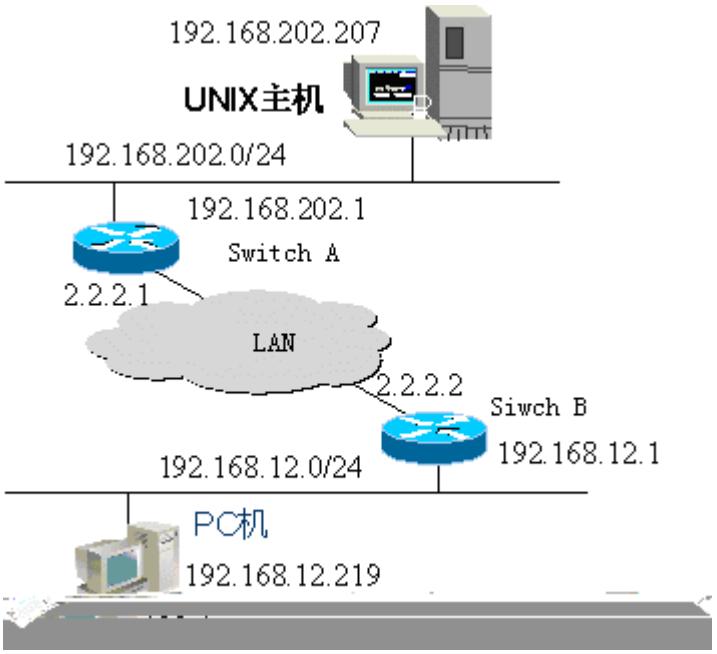
Ruijie (config-xxx-nacl)# [*sn*] { **permit** | **deny** } {src *src-wildcard* | **host** *src* | **any** } [**time-range** *tm-rng-name*]	ACL ,
Ruijie(config-xxx-nacl)# **exit** Ruijie(config)# **interface** *interface*	
Ruijie(config-if)# **ip access-group** *id* { **in** | **out** } [**reflect** | **unreflect**]	

,C• Ÿ |ACa] TJETBT1 0 0 1 271.74 651.20 Tm[[(.] TJETBT/F6 10.5 Tf1 0 0 1 12226

ACL ACL

(ACE)

fotocol] TJETBT/F6 10.5 Tf1 0 0 1 141.7 657.36 6m[1.5Tc[<074D0AB80AC8>- TJETBT/F1 10.5 Tf1 0 0 1 24467 657.36 6m[.Tc



Switch B

1. 192.168.12.0/24 UNIX TELNET PING

2. Switch B 192.168.202.0/24

Switch B

Time-Range

101 access-list 101 deny ip any any

Switch A

1.3 Expert

Expert

Expert

2. ( )

Expert

Ruijie (config)# **access-list** *id* {**deny** | **permit**} [*prot* | {[*ethernet-type*] [**cos** *cos*]}] [**VID** *vid*] {src *src-wildcard* | **host** *src* } {**host** *src-mac-addr* | **any**} {dst *dst-wildcard* | **host** *dst* | **any**}{**host** *dst-mac-addr* | **any**}] [**precedence** *precedence*] [**tos** *tos*] [**dscp** *dscp*] [**fragment**] [**time-range** *tm-rng-name*]	’
Ruijie(config)# **interface** *interface*	
Ruijie(config-if)# **expert access-group** *id* {**in** | **out** } [**unreflect**]	

ACL

Ruijie(config)# **expert access-list extended** {*id*|*name*}	
Ruijie (config-exp-nacl)# [*sn*]{ **permit** | **deny** }[*prot* | {[*ethernet-type*] [**cos** *cos*]}] [**VID** *vid*] {src *src-wildcard* | **host** *src* }{**host** *src-mac-addr* | **any**} {dst *dst-wildcard* | **host** *dst* | **any**}{**host** *dst-mac-addr* | **any**}][**precedence** *precedence*] [**tos** *tos*] [**dscp** *dscp*] [**fragment**] [**time-range** *tm-rng-name*]	ACL ,
Ruijie(config-exp-nacl)# **exit** Ruijie(config)# **interface** *interface*	
Ruijie(config-if)# **expert access-group** {*id*|*name*} {**in**|**out**} [**unreflect**]	

1.3.4 Expert

Expert

1. VLAN20 0013.2049.8272 Giga 0/1
2.

1.4 TCP Flag

TCP Flag TCP Flag Match-All
TCP Flag ACL TCP Flag ACL
TCP Flag TCP Flag

permit tcp any any match-all rst

TCP Flag RST 0

ACL ACL TCP MAC
IP

TCP Flag

Ruijie(config)# **ip access-list extended** { *id* | *name* }	
Ruijie(config-ext-nacl)# [*sn*] [**permit** | **deny**] **tcp** *source source-wildcard* [**operator port** [*port*]] *destination destination-wildcard* [**operator port** [*port*]] [**match-all** *flag-name*][**precedence** *precedence*]	ACL ,

Ruijie(config-exp-nacl)# **exit** Ruijie(config)# **interface** *interface*	
Ruijie(config-if)# **ip access-group** {*id* | *name*} {**in** | **out**}	

TCP Flag

1) enable

2)

3) ACL

4) ACL

5) deny

6)

7) end

8)

ip access-list resequence *tst_acl 100 3*, ACE

sn-num ace4

seq-num = 105 ace5

4 ace
ACE

ACE

1.6 ACL

ACL ACL
Time-Range

Time-Range

Time-Range

Ruijie# configure terminal	
Ruijie(config)# **time-range** time-range name	
Ruijie(config-time-range)# **absolute** [start time *date*] end time *date*	( ) time range

Ruijie(config-time-range)# **periodic** day-of-the-week time **to** [day-of-the-week] time	( ) time range
Ruijie# show time-range	
Ruijie# copy running-config startup-config	
Ruijie(config)# **ip access-list** extended *101*	ACL
Ruijie(config-ext-nacl)# **permit ip** any any time-range *time-range-name*	ACE

Time Range 1 32

1.7

1.7.1 TCP

TCP Flag ACL

A A B TCP
B A TCP

A G3/1 B
G3/2

B A TCP B
G3/2 TCP TCP TCP TCP
SYN ACK 0
Match-all G3/2 TCP SYN 1 ACK 0
A B

1)

#

ACL101

TCP Flag SYN=1 ACK 0

IP

2)

#

G3/2

ACL 101 G3/2

3)

show ACL

2 RPL

2.1 RPL

2.1.1 RPL

RPL reverse path limited

2.1.2 RPL

RPL

Ruijie(config-if)# **reverse-path**	RPL
Ruijie(config-if)#**no reverse-path**	RPL

2.1.3 RPL

Ruijie(config-if)# **reverse-path**

show ip route	IP

(

3

3.1

1 CPU

2 CLI

3

Classify

protocol sub-interface

manage sub-interface ftp telnet snmp arp

data sub-interface icmp

SCPP Segregate Control Plane Protection

Glean-CAR REF Glean
IP ip

ARP-CAR ARP ARP-CAR
ARP

Port-Filter TCP UDP

3.2

3.2.1

control-plane
SCPP
Glean-CAR
ARP-CAR
Port-Filter
MPP
ACPP

	acl_no SCPP pps
Ruijie(config-cp)# **scpp list** *acl_no* {**bw-rate** bw-rate **bw-burst-rate** *bw-burst-rate* }	acl_no acl scpp bw-rate pps

ARP-CAR manage

N N

ARP-CAR ARP A
192.168.52.57 B 192.168.60.57 192.168.52.1
ARP arp-car 5 A B 5
ARP

ARP-CAR ARP-CAR

3.2.6 Port-Filter

Port-Filter

Ruijie(config-cp)# **port-filter**	Port-Filter
Ruijie(config-cp)# **no port-filter**	Port-Filter

Port-Filter manage

Port-Filter Port-Filter

3.2.7 MPP

MPP

Ruijie(config-cp)# **management-interface** *interface* **allow** {**ftp** | **http** | **https** | **ssh** | **snmp** | **telnet** | **tftp**}	*Interface*
Ruijie(config-cp)# **no management-interface** *interface*	MPP

MPP manage

16

MPP

MPP MPP

3.2.8 security deny

ping web

Ruijie(config-cp)#security deny lan-ping | lan-web | wan-ping | wan-web	ping web
Ruijie(config-cp)# **no** security deny lan-ping | lan-web | wan-ping | wan-web	ping web

3.2.9 security web permit

security deny web IP web
web permit ip IP IP
web deny IP

Ruijie(config-cp)# security web permit *low-ip-address* [*high-ip-address*]	web IP *low-ip-address* IP IP *high-ip-address* IP
Ruijie(config-cp)# no security web permit *low-ip-address*	web IP

32 IP IP

3.2.10 ACPP

ACPP

Ruijie(config-cp)# **acpp bw-rate** *rate* **bw-burst-rate** *burst-rate*	ACPP *rate* pps *burst-rate* pps
Ruijie(config-cp)# **no acpp**	ACPP

ACPP

ACPP ACPP

3.2.11 anti-arp-spoof

ARP ARP ARP
ARP ARP (10s
200 ARP) MAC IP ARP MAC
MAC

no ARP

Ruijie(config-cp)#anti-arp-spoof	ARP
Ruijie(config-cp)# no anti-arp-spoof	ARP

3.2.12 attack thrshold

pps

Ruijie(config-cp)#attack threshold 500	

3.2.13

Ruijie# **configure terminal**	
Ruijie(config)#**attack-block enable**	
Ruijie(config)#**attack-block unblock { auto |** *time* **}**	
Ruijie(config)#**attack-block threshold { drop-kbps** *value1* **| drop-pps** *value2* **}**	IP
Ruijie# **end**	
Ruijie# **attack-block ip** *ip-addr time*	IP
Ruijie# clear **attack-block** [**ip** *ip-addr*]	IP IP IP

Ruijie# **configure terminal** //

Ruijie(config)#**attack-block enable** ***//***

Ruijie(config)#**attack-block unblock** *180* // 3

Ruijie(config)#**attack-block threshold drop-kbps** *10000* // 10000 kbps ip

Ruijie(config)#**attack-block threshold drop-pps** *5000* // 5000 pps ip

Ruijie# **end** ***//***

Ruijie# **attack-block ip** *1.1.1.1 300* // IP 1.1.1.1 5

	1. IP

3.3

3.3.1

Ruijie# **show ef-rnfp** {**acpp** | **scpp** | **glean-car** | **arp-car** | **port-filter** | **mpp** | **all** }	

3.3.6

&fr,.7Lia fhG!

// control-plane data

// ACPP data 500pps 600pps

// Glean-CAR 10 glean

// control-plane manage

// ACPP manage 500pps 600pps

// ARP-CAR 10 ARP

// Port-Filter

// MPP gi0/0 telnet snmp

4

4.1

4.1.1

ACL

ACL

L3 L4

4.1.2

DoS Denial of Service

DoS SYN Flood Fraggle

ICMP TCP

ICMP PING TCP

UDP

IP
Ping of Death Teardrop

4.1.3

1 Land

Land TCP SYN IP
SYN-ACK ACK
Land
UNIX Windows NT

2 Smurf

Smurf ICMP
ICMP
Smurf ICMP

Smurf
Fraggle

3 Winnuke

WinNuke Windows NetBIOS 139 OOB
out-of-band NetBIOS

4 SYN Flood

TCP/IP TCP SYN Flood
SYN
SYN-ACK

4.2

4.2.1

SYN Flood	
UDP Flood	

4.2.2

Ruijie (config)# **firewall enable**	
Ruijie (config)#**no firewall enable**	

4.2.3

4.2.3.1 SYN

SYN

Ruijie (config)# **firewall tcp-loose**	SYN
Ruijie (config)#**no firewall tcp-loose**	SYN

4.2.7 IP Flood

IP teardrop UDP
jolt2 (IP) (DoS)
flood CPU

Ruijie(config)#**firewall defend frag-flood** *rate-num*	IP Flood *rate-num* pps
[redacted]	

4.2.10 IP

IP IP

IP

IP

4.2.13 Fraggle

Fraggle Smurf UDP
UDP 7 —— Echo
Chargen

Ruijie(config)#**firewall defend fraggle**	Fraggle
Ruijie(config)#**no firewall defend fraggle**	Fraggle

4.2.14 Land

LAND
IP IP
Land

Ruijie(config)#**firewall defend land**	Land
Ruijie(config)#**no firewall defend land**	Land

4.2.15

/ /
/
/ TCP UDP
icmp
tcp

TCP

Ruijie(config)# **firewall defend scan counter-clear-interval sense-level {***high*|*low*|*medium***}** *time-interval*	3 second 1 2000
Ruijie(config)# **firewall defend scan ignored-protocol {***icmp*|*ip*|*tcp*|*udp***}**	

Ruijie(config)# **firewall defend scan sense-level**
{*high*|*low*|*medium***} [**

4.2.17 ICMP

ICMP

Ruijie(config)#

Ruijie#**show firewall count [*all* | *global*]**

0

all

4.4 ICMP FLOOD

4.4.1

interface vlan 2/3

ICMP FLOOD interface Vlan3

4.4.2

5

5.1

5.1.1

ftp mms h.323

acl

5.1.2

MMS H.323 SIP FTP RTSP TFTP

Ruijie(config)# **firewall alg [*all*|*h323*|*ftp*|*mms*|*rtsp*|*sip*|*tftp*]**	
Ruijie(config)#**no firewall alg [***all*|*h323*|*ftp*|*mms*|*rtsp*|*sip*|*tftp***]**	

Ruijie# show firewall dynamic-filter	

6 VPDN

6.1 VPDN

VPDN L2TP PPTP

L2TP(Layer Two Tunneling Protocol)

PPTP(Point-to-Point Tunneling Protocol)

VPDN PPTP
MicroSoft Windows L2TP Cisco L2TP
Windows 2000/XP

7 PPTP

7.1 PPTP

Point-to-Point-Tunneling Protocol (PPTP) VPN
Microsoft Windows NT® Workstation Windows® 95 Windows® 98 Windows® 2000
PPP ISP Internet
RFC 2637 Microsoft
Internet Engineering Task Force(IETF)

PPTP IP PPP PPP
PPP PPTP
Network Access Servers NAS PNS PPTP Network Server
PAC(PPTP Access Concentrator) PNS TCP/IP
IP PAC PSTN ISDN PPP

PNS PPTP
PPTP

7.2 PPTP

7.2.1

( )

Ruijie(config)# **ip local pool** *poolname first-ip* [*last-ip*]	/
Ruijie(config)# **no ip local pool** *poolname*	

poolname / *first-ip* *last-ip*

7.2.3

PPTP PPTP

Ruijie(config)# **username** *user-name* **password** *password*	
Ruijie(config)# **no username** *user-name*	

user-name *password*
( )

7.2.4 VPDN

PPTP VPDN VPDN

/ VPDN
VPDN
VPDN

VPDN

/ VPDN VPDN

7.2.4.1 / VPDN

Ruijie(config)# **no vpdn enable**	VPDN

VPDN PPTP
PPTP

7.2.4.2 VPDN

VPDN ( ) VPDN
PPTP

Ruijie(config)# **vpdn source-ip** *ip-address*	VPDN
Ruijie(config)# **no vpdn source-ip**	VPDN

7.2.4.3 VPDN

VPDN VPDN

Ruijie(config)# **vpdn session-limit** *sessions*	VPDN
Ruijie(config)# **no vpdn session-limit**	VPDN

7.2.4.4

VPDN

Ruijie(config)# **vpdn domain-delimiter @/%#-**	
Ruijie(config)# **no vpdn domain-delimiter**	VPDN

7.2.4.5

VPDN

Ruijie(config)# **vpdn authorize domain split**	
Ruijie(config)# **no vpdn authorize domain**	

7.2.4.6 VPDN

VPDN VPDN

Ruijie(config)# **vpdn limit_rate** *rate_num*	*rate_num* 5 100
Ruijie(config)# **no vpdn limit_rate**	

7.2.5 virtual-template

PPTP PPTP Virtual-access
Virtual-template

Virtual-template ( )
IP ( )
( )
IP ( )

IP IP

7.2.5.1 virtual-template

Virtual-template

Ruijie

7.2.6 VPDN-group

PPTP VPDN-group
VPDN-group

VPDN-group( )
( )
( )
( )
( )
( )
VPDN-group ( )
PPTP ( )
PPTP ( )
( )

7.2.6.1 VPDN-group

VPDN-group

Ruijie(config)# **vpdn-group** *name*	/ VPDN-group
Ruijie(config)# **no vpdn-group** *name*	VPDN-group

name VPDN-group VPDN-group

7.2.6.2

Ruijie (config-vpdn)# **accept-dialin**	
Ruijie (config-vpdn)# **no accept-dialin**	

PNS

7.2.6.3

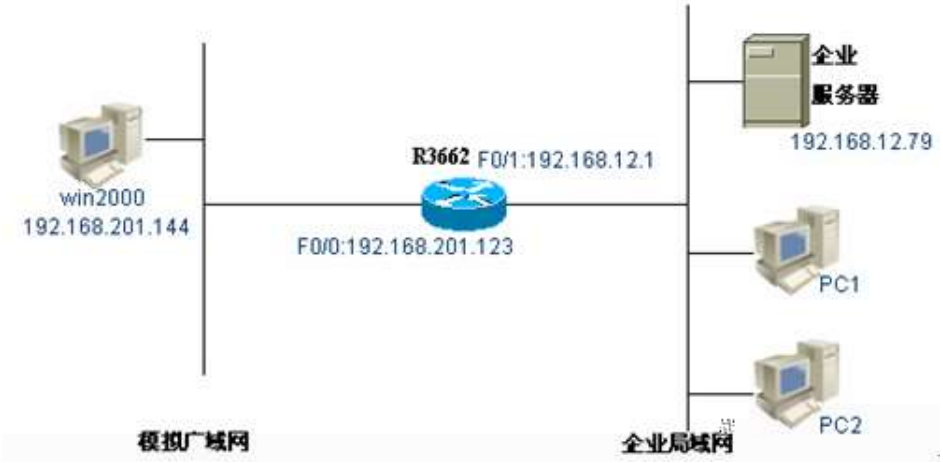
PPTP

Ruijie(config-vpdn-domain)# **no dns**	dns

domain-name vrf-name vrf *A.B.C.D* dns

7.2.7

RUIJIE PPTP
VPDN Win2000 PC VPDN RUIJIE
PPTP RUIJIE
IP IP



PPTP

RUIJIE Windows 2000

1)RUIJIE

2).Windows 2000

Win2000 — ‖ — ‖ — Internet ‖ — ‖ — ‖ 192.168.201.123 Vpdnconnect Vpdnconnect VPDN PPTP PAP pc 1111

Win2000 192.168.12.79

Ruijie# **show vpdn tunnel**	VPDN Tunnel
Ruijie# **show vpdn session**	VPDN Session
Ruijie# **show vpdn**	VPDN Tunnel Session
Ruijie# **show vpdn tunnel pptp** *locid*	id PPTP

L2TP PPTP

Total tunnels 1 sessions 1

ID LocID Remote Name State IP
Remote Address PPTP TCP Port Sessions
ID LocID ID RemID ID TunID
Virtual-Access Intf Username (State)

PPTP

debug vpdn error

7.2.8.3

PPTP VPDN

Windows2000 PPTP

— Ⅱ — T Ⅱ — D Ⅱ —

8 L2TP

8.1 L2TP

Layer 2 Tunnel Protocol(L2TP) Internet Engineering Task Force(IETF) Cisco Layer 2 Forwarding(L2F) Point-to-Point Tunneling Protocol (PPTP) RFC 2661

L2TP Point-to-Point Protocol(PPP) PPP PPTP L2TP UDP

L2TP VPN VPN

´ L2TP

L2TP

8.2.2.1 l2tp-class

L2TP L2TP-class

Ruijie(config)# **l2tp-class** *l2tp-class-name*	/ L2TP-class
Ruijie(config)# **no l2tp-class** *l2tp-class-name*	L2TP-class

L2TP-class-name / L2TP-class L2TP-class Pseudowire-class

8.2.2.2 L2TP

L2TP

Ruijie(config-l2tp-class)# **receive-window** *size*	
Ruijie(config-l2tp-class)# **no receive-window**	
Ruijie(config-l2tp-class)# **retransmit** {**initial** {**retries** *initial-retries* | **timeout** {**max** | **min**} *initial-timeout*} | **retries** *retries* | **timeout** {**max** | **min**} *timeout*}	
Ruijie(config-l2tp-class)# **no retransmit** { **initial** {**retries** | **timeout** {**max** | **min**} }| **retries** | **timeout** {**max** | **min**} }	
Ruijie(config-l2tp-class)# **timeout setup** *seconds*	
Ruijie(config-l2tp-class)# **no timeout setup**	

size 8 *initial-retries* SCCRQ 2 *initial-timeout* SCCRQ 1 8 *retries* 5 *timeou*t 1 8 *seconds* (Tunnel) 120

8.2.2.3 L2TP

L2TP (Tunnel)

Ruijie(config-l2tp-class)# **authentication**	
Ruijie(config-l2tp-class)# **no authentication**	
Ruijie(config-l2tp-class)# **no hostname**	
Ruijie(config-l2tp-class)# **hostname** *host-name*	
Ruijie(config-l2tp-class)# **password** *pass-words*	

Ruijie(config)# **no pseudowire-class** *pseudowire- class-name*	Pseudowire-class

pseudowire-class-name / **Pseudowire-class** **Pseudowire-class** **Interface Virtual-ppp** Peudowire

8.2.3.2 L2TP

L2TP

Ruijie (config-pw-class)# **encapsulation l2tpv2**	

L2TP
Peudowire-class L2TP L2TP

8.2.3.3 L2TP IP

L2TP IP

(config-pw-class)# **ip dfbit set**	
Ruijie (config-pw-class)# **no ip dfbit set**	
Ruijie (config-pw-class)# **ip ttl** *ttl-value*	IP TTL
Ruijie (config-pw-class)# **no ip ttl**	TTL
Ruijie (config-pw-class)# **ip local interface** *interface-name*	( )
Ruijie(config-pw-class)# **no ip local interface** *interface-name*	( )

L2TP IP L2TP UDP IP
TTL 255
( )

8.2.3.4 L2TP

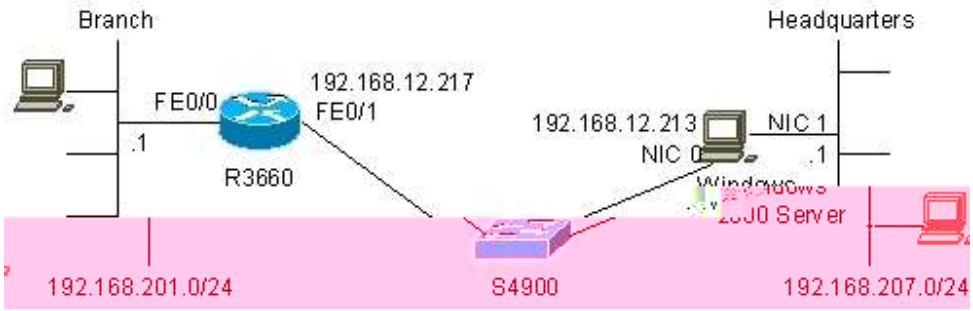
L2TP

Ruijie(config-pw-class)#**protocol l2tpv2** [*l2tp-class-name*]	L2TP
Ruijie(config-pw-class)#**no protocol**	

L2TPv2 RFC 2661

LNS L2TP DNS
DNS client LNS DNS

Ruijie (config-if)# **pseudowire hostname** *peer-hostname vcid* {**encapsulation l2tpv2** [**pw-class** *pw-class-name*] | **pw-class** *pw-class-name* }	Pseudowire



Windows 2000 Server(LNS)　　L2TP

RUIJIE　　Windows 2000 Server

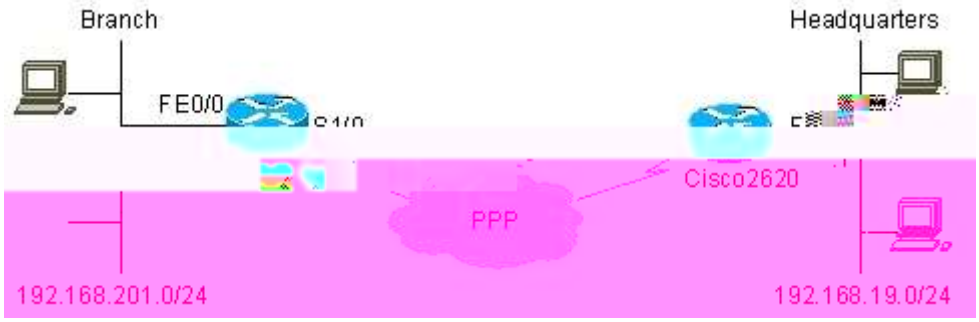
1).RUIJIE

ǁBranchǁ

ǁBranchǁ ǁDENGL-NECBOOKǁ Internet
ǁHeadquartersǁ VPDN
(192.168.201.78) 192.168.201.1
RUIJIE NAT

8.2.5.2 Cisco 2620

Ruijie Cisco 2620 L2TP Cisco 2620 L2TP Network Server(LNS)



Cisco 2620(LNS) L2TP

RUIJIE Cisco2620

1)RUIJIE

‖Branch‖ ( ) Virtual-ppp 1
‖Headquarters‖ L2TP Tunnel ‖Branch‖ (NAT
) interface Serial 0 Internet
FastEthernet 0 (
ADSL WAN) NAT Serial 0
ARP

2)Cisco2620

Windows 2000 Cisco 2620 L2TP IPSec/IKE
Cisco L2TP Windows 2000 L2TP
Cisco2620 OSPF 192.168.201.0/24

8.2.5.3 windows 2000 hostname

Ruijie Windows 2000 PC PC windows 2000

PC hostname DNS Ruijie DNS client Ruijie ping DNS

Ruijie LAC

8.3.4 VPDN

L2TP VPDN
VPDN

/ VPDN
VPDN
VPDN

VPDN
VPDN

, / VPDN VPDN

8.3.4.1 / VPDN

VPDN
L2TP L2TP VPDN

Ruijie(config)# **vpdn enable**	VPDN
Ruijie(config)# **no vpdn enable**	VPDN

VPDN / VPDN
L2TP

8.3.4.2 VPDN

VPDN ( ) VPDN
L2TP

Ruijie(config)# **vpdn session-limit** *sessions*	VPDN
Ruijie(config)# **no vpdn session-limit**	VPDN

8.3.4.4

VPDN

Ruijie(config)# **vpdn domain-delimiter @/%#-**	
Ruijie(config)# **no vpdn domain-delimiter**	VPDN

8.3.4.5

VPDN

Ruijie(config)# **vpdn authorize domain split**	
Ruijie(config)# **no vpdn authorize domain**	

8.3.4.6 VPDN

RFC L2TP

8.3.4.7 VPDN

VPDN VPDN

Ruijie(config)# **vpdn limit_rate** *rate_num*	*rate_num* 5 100
Ruijie(config)# **no vpdn limit_rate**	

8.3.5 virtual-template

L2TP L2TP
Virtual-access Virtual-template

Virtual-template ( )
IP ( )
( )
IP ( )

IP IP

8.3.5.1 virtual-template

Virtual-template

Ruijie(config)# **interface virtual-template** *number*	/ Virtual -template

( )

( )

( )

( )

VPDN-group ( )

L2TP ( )

L2TP ( )

( )

PPP

8.3.6.4

VPDN-group

Ruijie(config-vpdn-acc-in)# **virtual-template** *number*	
Ruijie(config-vpdn-acc-in)# **no virtual-template**	

VPDN-group

8.3.6.5

VPDN-group
VPDN-group
VPDN-group VPDN

Ruijie(config-vpdn)# **terminate-from hostname** *name*	
Ruijie(config-vpdn)# **00940.981 00 g[( )] T TQQ**	

Ruijie(config-vpdn)# **source-ip** *src-ip*	VPDN-group
Ruijie(config-vpdn)# **no source-ip**	VPDN-group

src-ip VPDN-group

8.3.6.8 L2TP

L2TP Ruijie

300 L2TP L2TP
L2TP
interval Hello *seconds*
ipsec AVP Hidden Cisco
RFC2661 AVP Hidden RFC2661 AVP

8.3.6.9 L2TP

L2TP IP/UDP

Ruijie(config-vpdn)# **l2tp ip udp checksum**	UDP
Ruijie(config-vpdn)# **no l2tp ip udp checksum**	UDP
Ruijie(config-vpdn)# **ip tos** *tos-value*	IP TOS
Ruijie(config-vpdn)# **no ip tos**	IPTOS
Ruijie(config-vpdn)# **ip precedence** *value*	IP Precedence
Ruijie(config-vpdn)# **no ip precedence**	IP Precedence

tos-value L2TP IP TOS *value* IP Precedence
L2TP L2TP UDP Checksum
L2TP IP TOS 0 IP Precedence 0

tos precedence L2TP PPTP

8.3.6.10 vrf

l2tp vrf VT ip vrf forward vrf

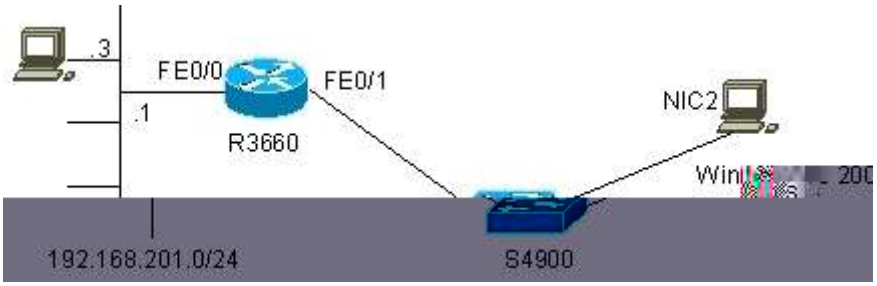
Ruijie(config-vpdn)# **vpn vrf** *vrf-name*	vrf
Ruijie(config-vpdn)# **no vpn vrf**	vrf

vrf-name vrf

8.3.6.11

vpdn group group

Ruijie(config-vpdn)#



Windows 2000(LAC)　　L2TP

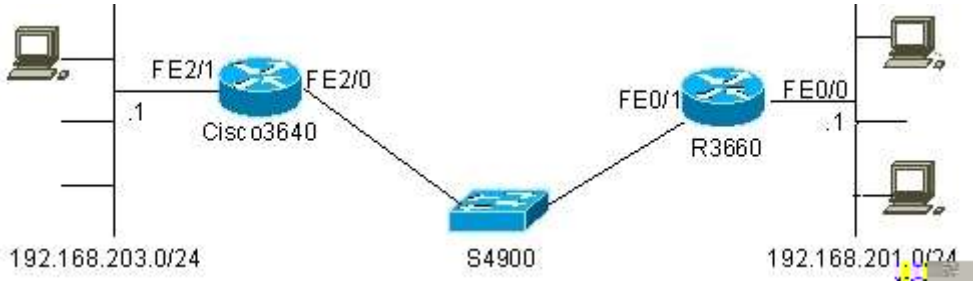
RUIJIE　　Windows 2000 Server

1)RUIJIE

2)Windows 2000

8.3.7.2 Cisco 3640

Ruijie Cisco 3640 L2TP



Cisco 3640(LAC) L2TP

RUIJIE# Cisco 3640

1)RUIJIE

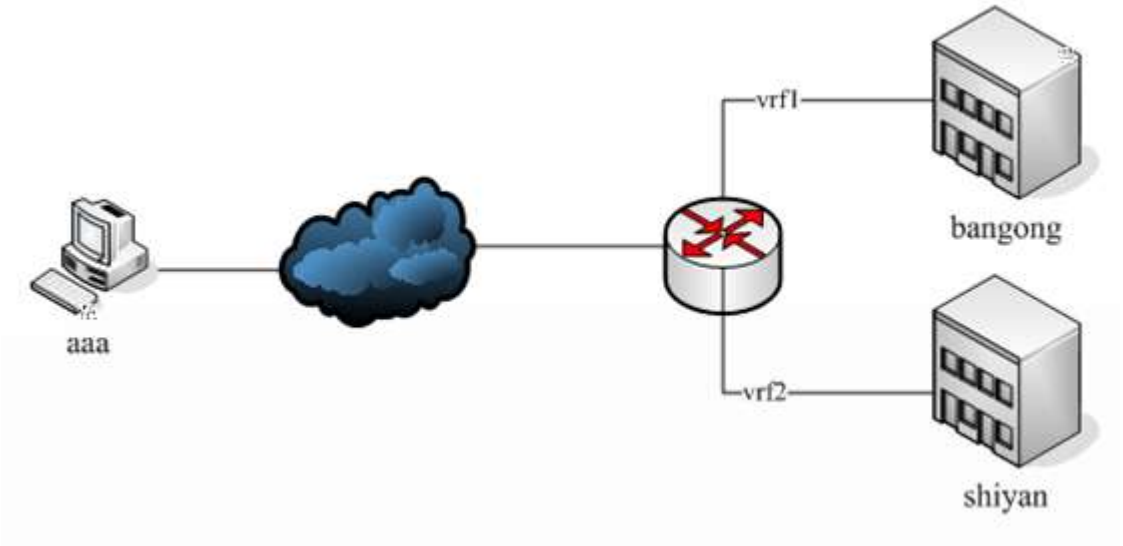
L2TP

2)Cisco 3640

2)Cisco2620

Mobile User ‖pc@i-net.com.cn‖ ‖1111‖ L2TP RUIJIE 192.168.19.0/24

8.3.7.4


vrf1
bangong
aaa
vrf2
shiyan

LNS VP VRF
VP VP
LNS VA VRF VRF
LNS

8.4.1.2 VPDN

VPDN L2TP PPTP LNS
( ) VPDN

8.4.1.3 L2TP

L2TP L2TP
l2x-data LNS ( )
L2TP

8.4.1.4 L2TP

l2x-erorrs (
)

8.4.1.5 L2TP

l2x-events L2TP
l2x-evetns LNS ( )

l2x-evetns LAC L2TP Server
( )

8.4.1.6 L2TP

L2TP **l2x-packets** L2TP
l2x-packets LNS
( )

l2x-packets LAC L2TP Server
( )

8.4.3

L2TP

Windows L2TP MicroSoft

Windows L2TP Cisco IOS
AVP (Hidden) (Sequencing)
Cisco IOS L2TP AVP Hidden

LAC LAC
LNS Cisco
Virtual-template **ip unnumbered** **ip unnumbered**
Loopback
L2TP ( )
L2TP

UDP 1701
L2TP

9 Tunnel

9.1 Tunnel

9.1.1 Tunnel

Tunnel Tunnel

Tunnel

Tunnel

Tunnel ( ) Tunnel
IP

IP (IP) Tunnel
Tunnel
(IP)

(IP)

VPN (virtual private network)

Tunnel

Ruijie(config-if)# **tunnel mode** { **gre ip** | **ipip** }	Tunnel
Ruijie(config-if)# **no tunnel mode**	Tunnel

	tunnel mode

9.1.2.6 Tunnel

Tunnel

Ruijie(config-if)# **tunnel checksum**	Tunnel
Ruijie(config-if)# **no tunnel checksum**	Tunnel

Tunnel

9.1.2.7 Tunnel Key

Tunnel Key Tunnel

Ruijie(config-if)# **tunnel key** *key-value*	Tunnel Key
Ruijie(config-if)# **no tunnel key**	Tunnel Key

Tunnel GRE Tunnel Key
GRE Tunnel Key

	(1) Tunnel Key (2) GRE GRE Key Key (3)

9.1.2.8 Tunnel

Tunnel

Ruijie(config-if)# **tunnel sequence-datagrams**	Tunnel
Ruijie(config-if)# **no tunnel sequence-datagrams**	Tunnel

Tunnel GRE

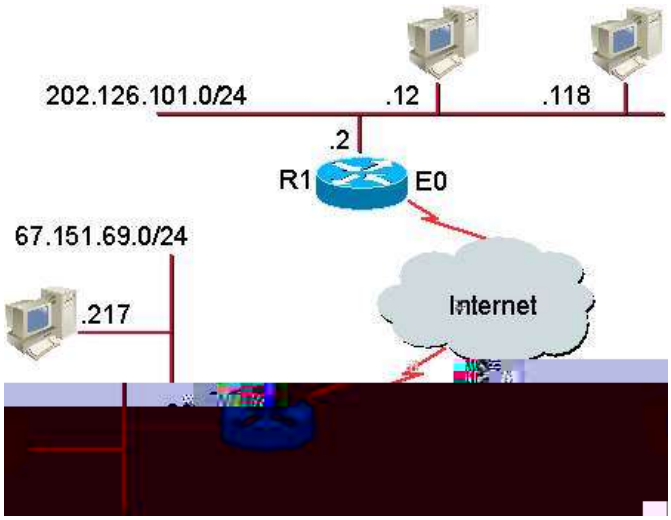
Ruijie(config-if)# **tunnel path-mtu-discovery** [**age-timer** {*aging-mins* | **infinite**} | **min-mtu** *mtu-bytes*]	tunnel PMTUD age-timer MTU MTU MTU aging-mins 1-30 10 infinite MTU min

Ruijie(config-if)# **tunnel vrf** *vrf-name*	Tunnel VRF
Ruijie(config-if)# **no tunnel vrf**	Tunnel VRF

IPv4 VRF IP IP VRF VRF IP down

tunnel vrf	IPv4 over IPv4 GRE

9.1.3 Tunnel



Tunnel

R1 R2 Tunnel R1 202.126.101.0/24 R2 67.151.69.0/24 R1 R2 Tunnel Tunnel R1 R2 (VPN) R1 R2 Tunnel

R1

R2

R1 R2 f0/0 Tunnel f0/1

9.1.4 Tunnel

show interfaces tunnel debug [gre/ip | ipip]

Ruijie# **show interfaces tunnel** *tunnel-number*

Ruijie # debug gre/ip
Ruijie #
GRE: to decaps 192.168.200.100 - >192.168.200.200(len=132
ttl=255) 112

:M' Ÿ n/j þFJFƒ,´- ,´1 &é (192.168.200.100) f ` 0 Z GRE/IP ž 5 È'f >) GRE F >|
ö 1 Ç `COE- IP ž 5 Ä

9.1.5 Tunnel Õ ,´ uLÌAú Ý > ÂL"

² Ì Tunnel T1 =7-!" hFJAß È þ ; éM'63 Ö

OÆ x õN«.ž Tunnel ,´ T1 ˆ X F FJ,´(™*6FJFƒ È £ X = ¯+X Tunnel ,´ & IF T1 • § 95•
5 F FJ W È • a _ Tunnel ,´$ÀFJAß ` p ( \ ` ` p ) õN«7- > Tunnel ,´- ,´FJAß ` p ( )1 ,´5•5
` p)F >|!" hFJAß ×

¦!v!rU" zb b %YB ¦!v. zb b %YBSþ" bá ¿Tä¤h2Ëô1 7 Ä F FJ W È • a _

10 IPSec

10.1

10.1.1

sniffer

IPSec IP IPSec
IPSec IP

NAT NAT IPSec NAT IPSec
IPSec IP

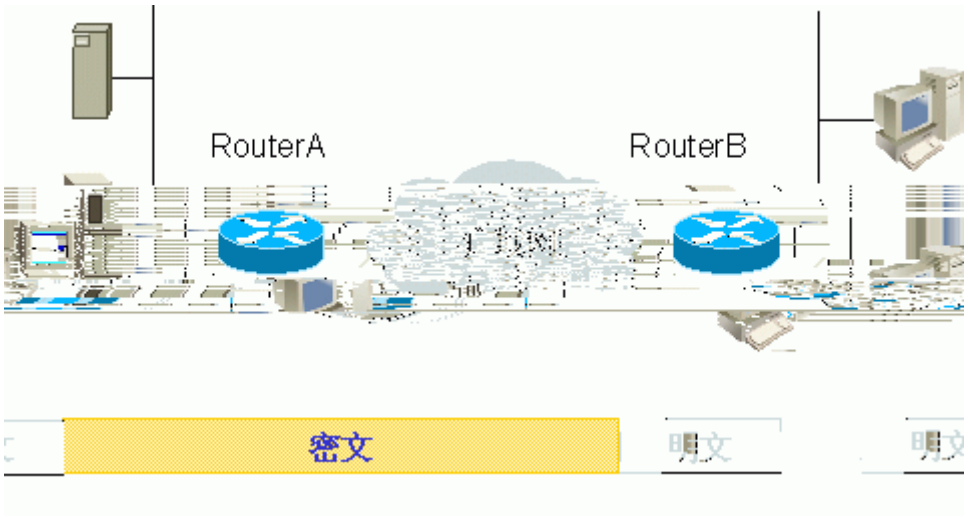
10.2 IPSec

10.2.1 IPSec

IPSec IPSec

IPSec

) 1 v



IPSec

10.2.2 IPSec

IPSec IPSec IPSec
IKE IKE IKE
IPSec IKE

IPSec

( )
IKE IPSec

IPSec **DF bit** IPSec IP
IPSec
IPSec

IPSec
IPSec
IPSec

IPSec IPSec IPSec IPSec
IPSec MIB IPSec SNMP IPSec IPSec mib

IKE UDP 500 IPSec ESP AH 50 51 IPSec IPSec 50 51 UDP 500

10.2.2.1

IP DF bit 1 0
IPsec IPSec ip
DF bit ip

10.2.2.4

IPSec

ah-md5-hmac esp-

ah-sha-hmac esp-3des esp-md5	AH SHA HMAC ESP 3DES MD5 HMAC

IKE

IPSec

IPSec

Ruijie(config-crypto-map)# **set session-key inbound esp** *spi* **cipher** *hex-key-data* [**authenticator** *hex-key-data*]	ESP ESP ESP ESP spi spi
Or Ruijie(config-crypto-map)# **set session-key outbound esp** *spi* **cipher** *hex-key-data* [**authenticator** *hex-key-data*]	
Ruijie(config-crypto-map)# **set mtu** *length*	
Ruijie(config-crypto-map)# **exit**	

A

myset

mymap

B

myset

mymap

	hex-key-data 16 cipher **hex-key-data** **hex-key-data** IPSec DES 3DES AES SM1 3DES authenticator hex-key-data sha md5 des, 64bits abcdef1234567890 0xabcdef1234567890 authenticatior 1-9,a-f 0x

	16 bit	
Des	64 8	set session-key inbound esp 300 cipher abcdef1234567890
3Des	192 24	set session-key inbound esp 300 cipher abcdef1234567890 abcdef1234567890 abcdef1234567890
aes	128 16	set session-key inbound esp 300 cipher abcdef1234567890abcdef1234567890
sm1	128 16	set session-key inbound esp 300 cipher abcdef1234567890abcdef1234567890
Md5	128 16	set session-key inbound esp 302 cipher abcdef1234567890 authenticator abcdef1234567890abcdef1234567890
Sha	160 20	set session-key inbound esp 302 cipher abcdef1234567890 authenticator abcdef1234567890abcdef1234567890abcd

IPSec

IKE

IKE

10.2.2.7.2

IPSec MD5 SHA

Ruijie(config)#**crypto ipsec security-association replay disable**	

	QoS IPSec IPSec

10.2.2.7.3

Ruijie(config-crypto-map)# **set pfs** *group1* | *group2*	Diffie-Hellman

ike
IPSec IPSec

IPSec
IPSec

IPSec

access list permit
IPSec

access list permit SA
SA SA
SA

permit deny	any	permit IPSec

Ruijie(config-crypto-map)# **set peer** {*hostname* | *ip-address*}	IPSec peer
Ruijie(config-crypto-map)# **set security-association lifetime seconds** *seconds*	
Or Ruijie(config-crypto-map)# **set security-association lifetime kilobytes** *kilobytes*	
Ruijie(config-crypto-map)# **set mtu** *length*	
Ruijie(config-crypto-map)# **exit**	

Ruijie(config-crypto-map)# **set transform-set** *transform-set-name1* [*transform-set-name2…transform-set-name6*]	
Ruijie(config-crypto-map)# **set security-association lifetime seconds** *seconds*	
Or Ruijie(config-crypto-map)# **set security-association lifetime kilobytes** *kilobytes*	
Ruijie(config-crypto-map)# **set exchange-mode** *main* | *aggressive*	
Ruijie(config-crypto-map)# **set pfs** *group1* | *group2*	Diffie-Hellman
Ruijie(config-crypto-map)# **set mtu** *length*	

Ruijie # **tunnel protection ipsec profile** *profile-name*	Tunnel

IPSec

	Profile Tunnel Tunnel GRE IPIP IPV6 Tunnel Profile match any IPIP IPV6 Tunnel

10.2.2.11 IPSec

IPSec

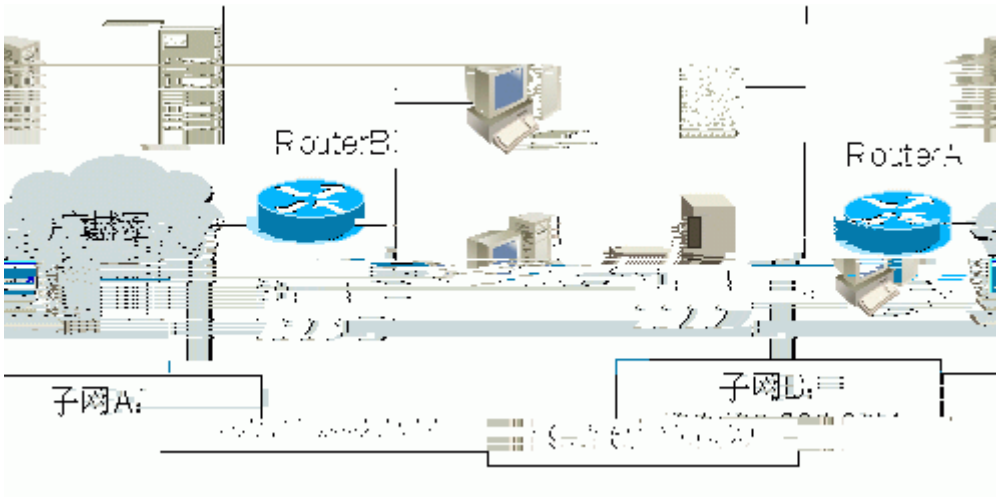
IPSec

IPSec

Ruijie# **clear crypto sa**	
Ruijie# **clear crypto sa peer** {*ip-address* |	

10.2.3 IPSec

A 192.168.12.0/24 B 192.168.202.0/24 IP
RouterA 192.168.12.1 RouterB
192.168.202.1 ESP-DES-SHA



IPSec

IP IKE
RouterA RouterB RouterA
IKE ⅢKE —

RouterA

#

#

IPSec .

10.3 IKE

10.3.1 IKE

IKE IPSec IPSec IP
IP IPSec IKE IKE
IPSec IPSec IKE
ISAKMP Oakley Skeme ISAKMP
Oakley Skeme IKE

IKE IPSec (IKE IPSec)
IPSec IKE IKE

IPSec
IKE IPSec

IKE IPSec IPSec
IPSec IKE IPSec

10.3.2 IKE

IKE

IKE

IKE IKE

IKE **IKE**

IKE

IKE

nat-t **udp** **nat**

10.3.2.1 IKE

IKE IKE IPSec
IPSec

IKE

Ruijie(config)# **no crypto isakmp enable**	IKE
Ruijie(config)# **crypto isakmp enable**	IKE

IKE

IKE IPSec

10.3.2.2 IKE

IKE UDP UDP 500
IKE IKE

10.3.2.3 IKE

IKE IKE IKE

IKE

	des 56 DES-CBC	

56 DES-CBC

Diffie-Hellman	1	768 Diffie-Hellman	768 Diffie-Hellman
	2	1024 Diffie-Hellman	
IKE		1	86400

IKE IKE

HASH Diffie-Hellman

IKE
IPSec IKE IPSec

56 DES-CBC,168 3DES-CBC,128 AES-CBC 128
SM1-CBC
SHA-1 MD5 MD5 SHA-1
MD5 IKE HMAC
MD5
RGOS

Diffie-Hellman 768 1024 Diffie-Hellman 1024
Diffie-Hellman CPU
IKE IPSec IKE
IKE
IPSec

IKE
1 10000 1

HASH Diffie-Hellman

Ruijie(config)# **crypto isakmp policy** *Priority*	
Ruijie(config-isakmp)# **encryption** **des | 3des | aes-128 | aes-192 | aes-256 | sm1**	
Ruijie(config-isakmp)# **hash** {**sha** | **md5**}	HASH
Ruijie(config-isakmp)# **authentication** {**pre-share | rsa-sig | digital-email**}	

10.3.2.9

IKE

IKE

Router(config)# **ip host** *hostname address*	hostname hostname ip
Ruijie(config)# **crypto isakmp key 0|7** *keystring* { **hostname** *peer-hostname* | **address** *peer-address* }	IKE 0 7
Router(config)# **crypto isakmp key 0|7** *keystring* **address** *peer-address* [*mask*]	IKE peer-address mask 0.0.0.0 0.0.0.0

Router(config)# **crypto isakmp keepalive** *seconds*	seconds——	5

Router(config)# **crypto isakmp rg-sm1**	IKE

10.3.2.14 IKE

IKE

IKE

10.3.4

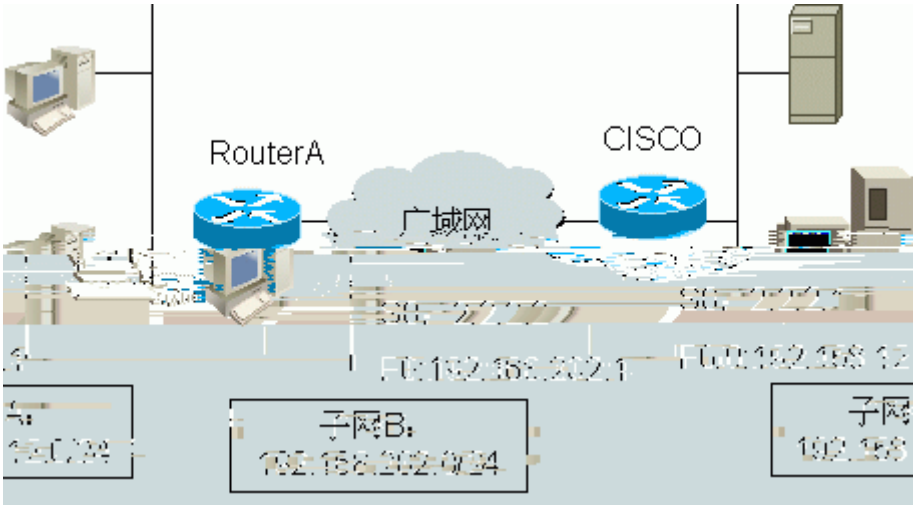
10.3.4.1

IP Cisco A
B

3des

ESP-DES-MD5

Cisco :



IPSec

RouterA IKE
Cisco

IKE

RouterA

IKE

#

#

192.168.202.0/24 192.168.12.0/24 IP

Cisco

IkE

#

#

#

#

RouterA

#

#

#

192.168.202.0/24 192.168.12.0/24 IP

Cisco

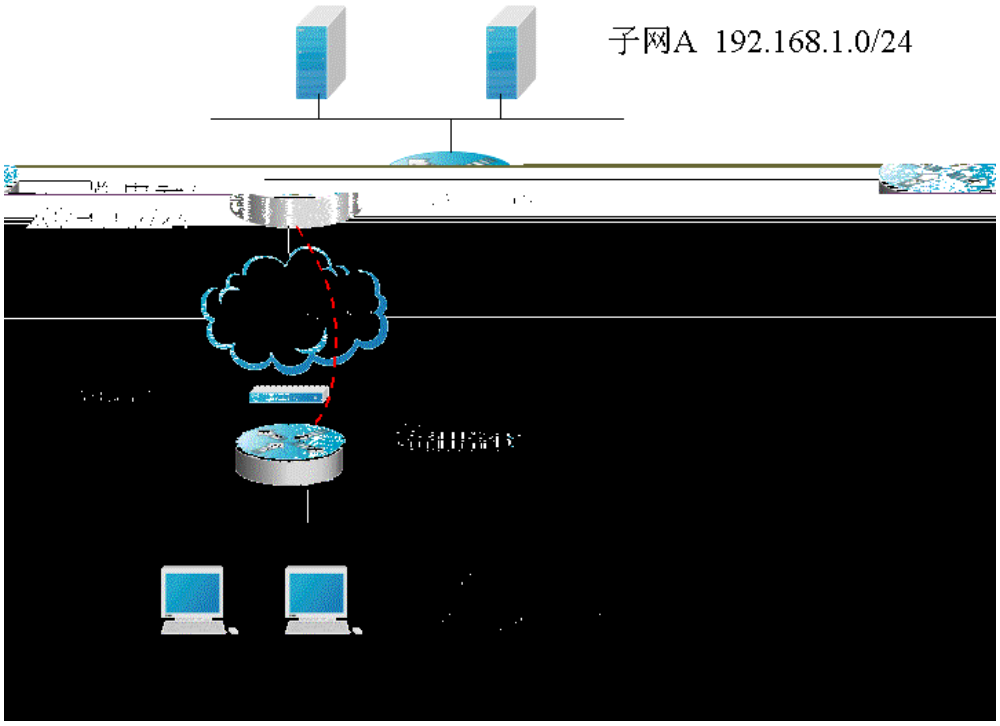
IKE IPSec

IKE

IPSec

10.3.4.2

IP A



IPSec

RouterB RouterA

RouterB

IKE

#

#

#

192.168.12.0/24 192.168.1.0/24 IP

RouterA

IkE

ip

#

#

#

#

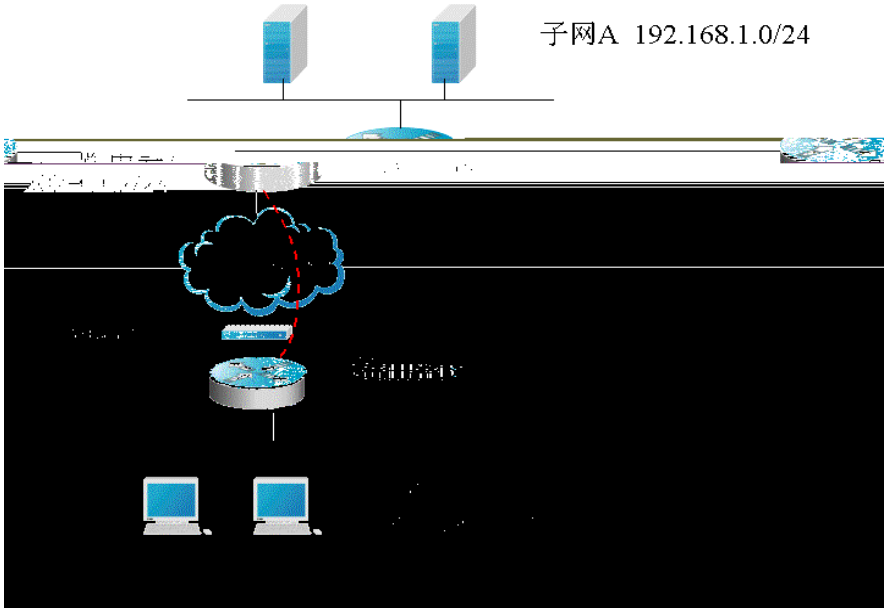
192.168.1.0/24 192.168.12.0/24 IP

10.3.4.3

IP A A
B B

ESP-DES-MD5
A ip :202.1.1.2/24 Internet
B ADSL pppoe Internet ip ISP

IKE



RouterB RouterA

RouterB

IKE

#

#

#

#

192.168.12.0/24 192.168.1.0/24 IP

RouterA

IkE

ip hostname

#

#

#

#

#

192.168.1.0/24 192.168.12.0/24 IP

10.3.4.4

IKE l2tp l2tp
IKE ipsec l2tp l2tp ospf

ESP-DES
ip :63.23.12.212/29 Internet
ADSL pppoe Internet ip

routerA

#

#

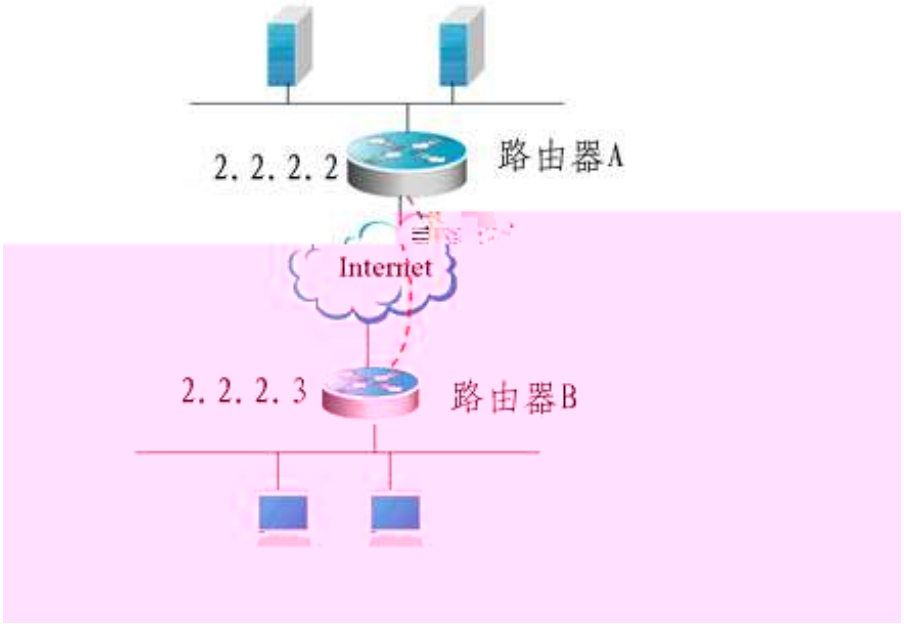
routerB routerC routerA

	copy tft flash config.text **crypto pki import pem terminal**

10.3.4.5

IP A
B
3des

esp-3des :



A

```
ip host peerhost 2.2.2.2
ip access-list extended 110
  10 permit ip host 2.2.2.3 host 2.2.2.2
crypto isakmp policy 1
  authentication pre-share
!
!
crypto isakmp key 7 01334b46391e033004 address 0.0.0.0 0.0.0.0
```

```
crypto ipsec transform-set myset    esp-3des
crypto dynamic-map dymap 100
  set transform-set myset
  reverse-route
  match address 111
!
!
crypto map mymap 7 ipsec-isakmp dynamic dymap


interface GigabitEthernet 1/0/0
  ip ref
  ip address 2.2.2.3 255.255.255.0
  crypto map mymap
  duplex auto
  speed auto
end
```

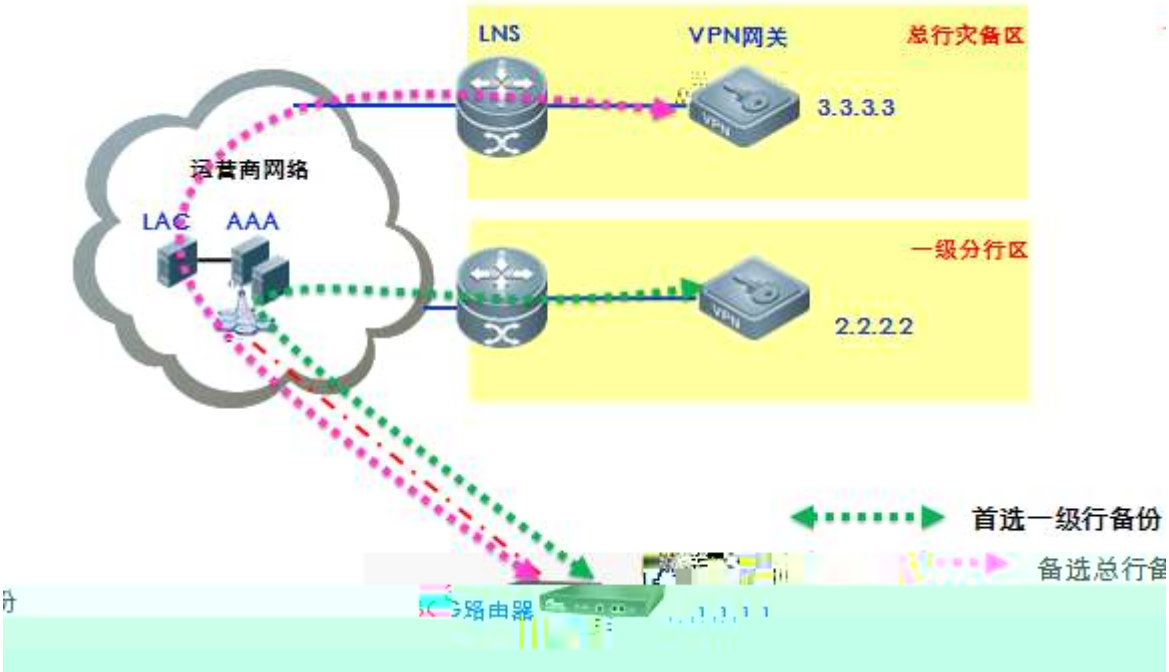
B

```
ip access-list extended 110
  10 permit ip host 2.2.2.2 host 2.2.2.3
crypto isakmp policy 1
  authentication pre-share
crypto isakmp key 7 0424100330052a1b15 address 0.0.0.0 0.0.0.0
crypto ipsec transform-set myset    esp-3des
crypto map mymap 10 ipsec-isakmp
  set peer 2.2.2.3
  set transform-set myset
  match address 110
interface FastEthernet 0/0
  ip address 2.2.2.2 255.255.255.0
```

```
 crypto map mymap
 duplex auto
 speed auto
!
interface FastEthernet 0/1
 ip address 200.1.1.10 255.255.255.0
 duplex auto
 speed auto
end
```

10.3.4.6 peer

peer



vpn

A

```
//              policy
!
crypto ipsec transform-set myset    esp-3des
crypto dynamic-map dymap 100
 set transform-set myset
 reverse-route
!
!
crypto map mymap 7 ipsec-isakmp dynamic dymap
interface GigabitEthernet 1/0/0
 ip ref
 ip address 2.2.2.3 255.255.255.0
 crypto map mymap
 duplex auto
 speed auto
end
                B
//              policy
!
crypto ipsec transform-set myset    esp-3des
crypto dynamic-map dymap 100
 set transform-set myset
 reverse-route
!
!
crypto map mymap 7 ipsec-isakmp dynamic dymap
interface GigabitEthernet 1/0/0
 ip ref
 ip address 2.2.2.2 255.255.255.0
```

```
 crypto map mymap
 duplex auto
 speed auto
end
                A


ip access-list extended 110
 10 permit ip host 2.2.2.1 any
!
//              policy
//       dpd
crypto isakmp keepalive 10 2 periodic
//       3des
crypto ipsec transform-set myset    esp-3des
!
crypto map mymap 7 ipsec-isakmp
set peer 2.2.2.2 //
set peer 2.2.2.3 trustpoint backup
set transform-set myset
match address 100


interface GigabitEthernet 1/0/0
 ip ref
 ip address 2.2.2.1 255.255.255.0
 crypto map mymap
 duplex auto
 speed auto
end
```

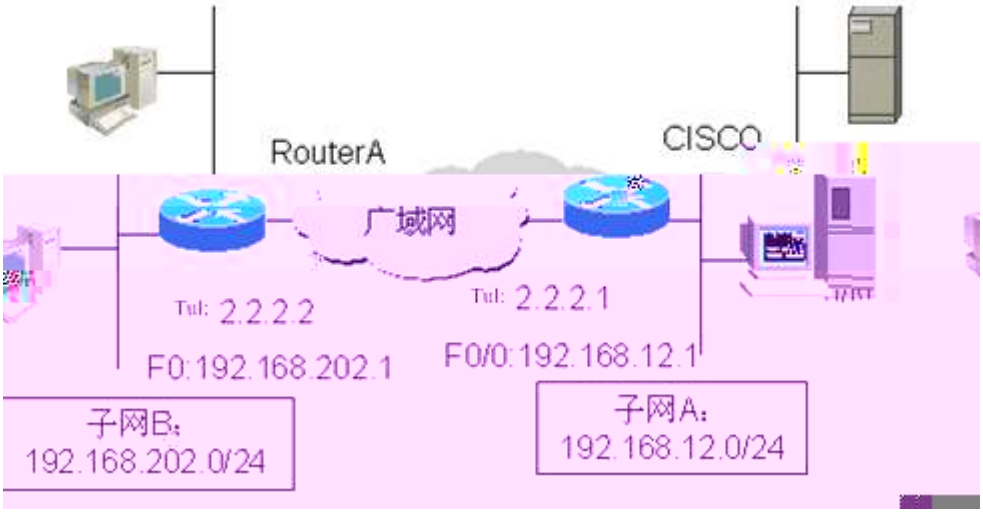
10.3.4.7 Profile Tunnel

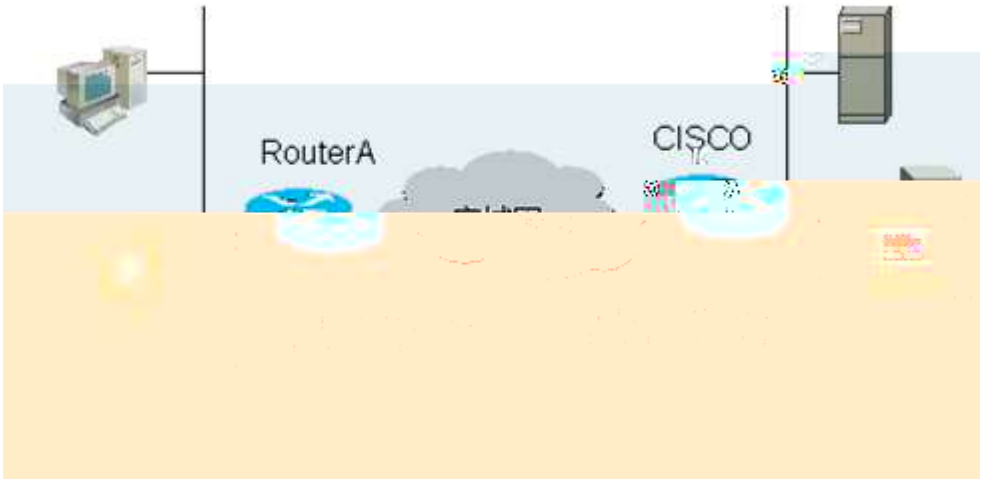
IP Cisco A
B

3des

ESP-DES-MD5

Cisco :





10.3.4.7.1 GRE Tunnel Profile map

RouterA

IKE

10.3.4.7.2 IPSEC-IPV4 Profile map

RouterA

IKE

#

®« ñ %`

Tunnel

10.3.4.7.3 IPV6 Tunnel Profile map

RouterA

IKE

crypto

#

10.3.4.7.4 NAT IPIP T,B$aR:'

NAT

#NAT ACL

ip access standard 1

10 permit any

Router A

interface FastEthernet 0/0

ip address 192.168.202.2 255.255.255.0

ip nat inside

!

Router B

interface FastEthernet0/1

ip add 192.168.12.2 255.255.255.0

ip nat outside

!

#NAT F0/0 IP F0/1

ip nat inside source list 1 interface fastEthernet 0/1

!

Cisco

IkE

#

#

#

Tunnel

10.3.4.7.5 NAT IPSEC-IPV4 Tunnel Profile map

RouterA

IKE

#

#

NAT

#NAT ACL

ip access standard 1

10 permit any

Router A

interface FastEthernet 0/0

ip address 192.168.202.2 255.255.255.0

ip nat inside

!

Router B

interface FastEthernet0/1

ip add 192.168.12.2 255.255.255.0

ip nat outside

!

#NAT F0/0 IP F0/1

ip nat inside source list 1 interface fastEthernet 0/1

!

Tunnel

11

11.1

PKI

CA Certificate Authority

CA

CA

X.509 PGP

X.509

IPSec IKE SSL IPSec IKE

X.509 SCEP SCEP

SCEP PKCS7

CA SCEP

11.1.1

PKI Public-Key Infrastructure

X.509 X.509 ITU-T PKI

CA CA CA

Certificate X.509 X.509 ,
CA
( )
ITUT X.509

CA CA

PEM(Privacy-enhanced Mail) rfc 1421-rfc1424 base64 ,
,

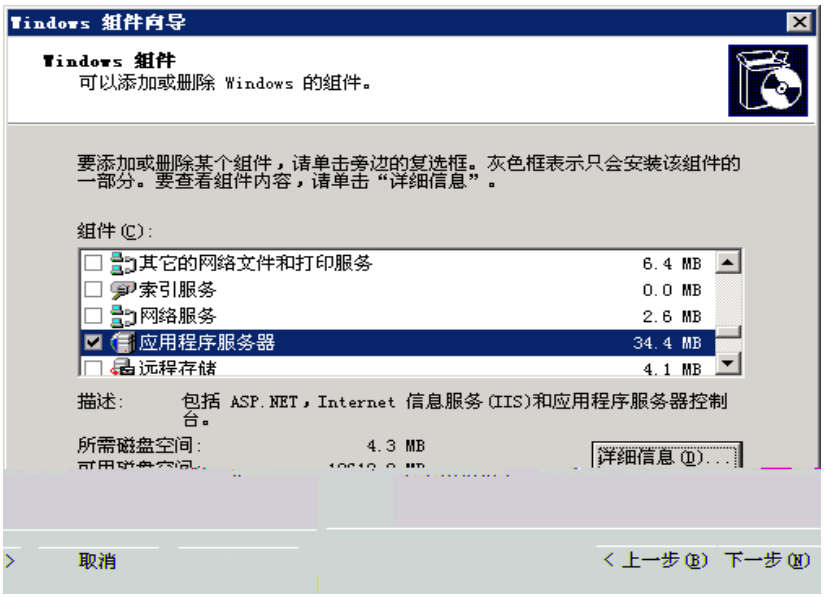
PKCS RSA ,
PKCS#1 RSA , PKCS#7 , PKCS#12
(PKCS12 , ,)
PKCS DER PEM

CRL Certificate Revocation List CA
Internet X.509
PKIX CRL

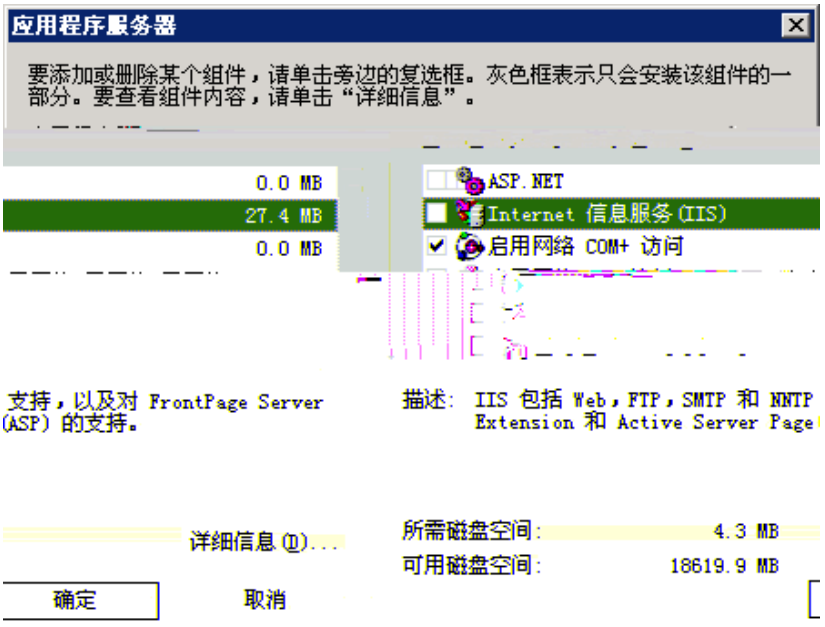

Windows 组件向导
Windows 组件
可以添加或删除 Windows 2000 的组件。
要添加或删除某个组件，请单击旁边的复选框。灰色框表示只会安装该组件的一部分。要查看组件内容，请单击“详细信息”。
组件(C):
远程存储 3.5 MB
证书服务 1.4 MB
终端服务 14.3 MB
终端服务授权 0.9 MB
描述: 安装证书颁发机构以便申请证书用于公钥安全应用程序。
所需磁盘空间: 11.5 MB
可用磁盘空间: 2869.8 MB
详细信息(D)...
< 上一步(B)
下一步(N) >
取消

CA

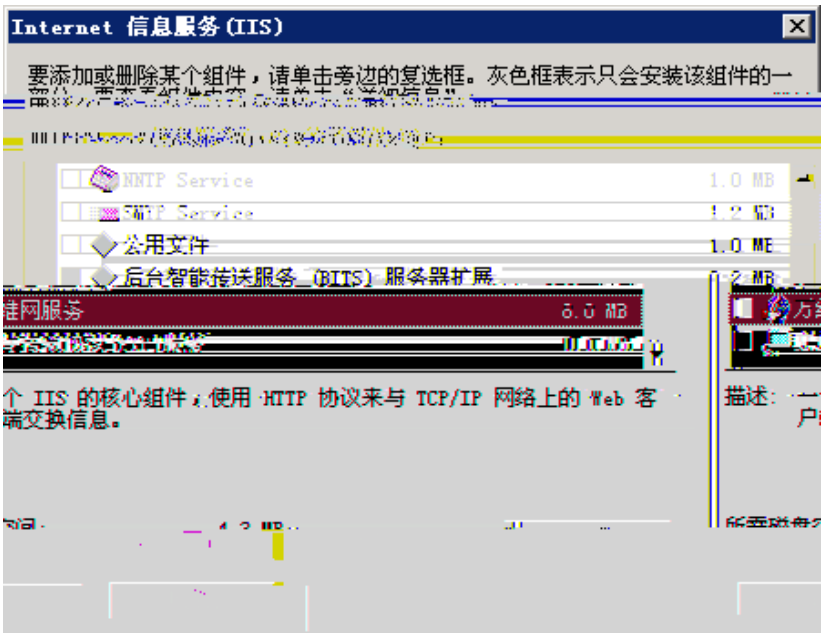
CA



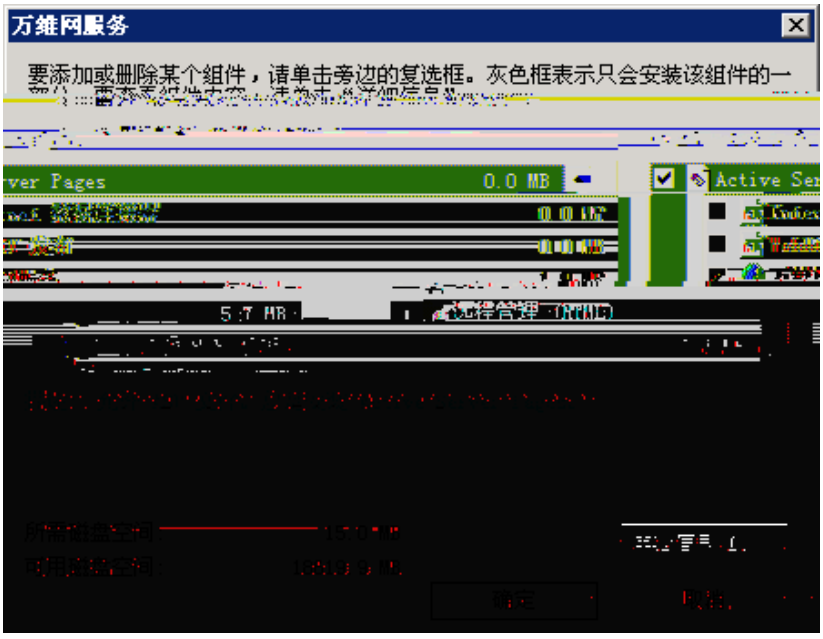
Internet Ⅱ — Ⅱ



— Ⅱ — Ⅱ

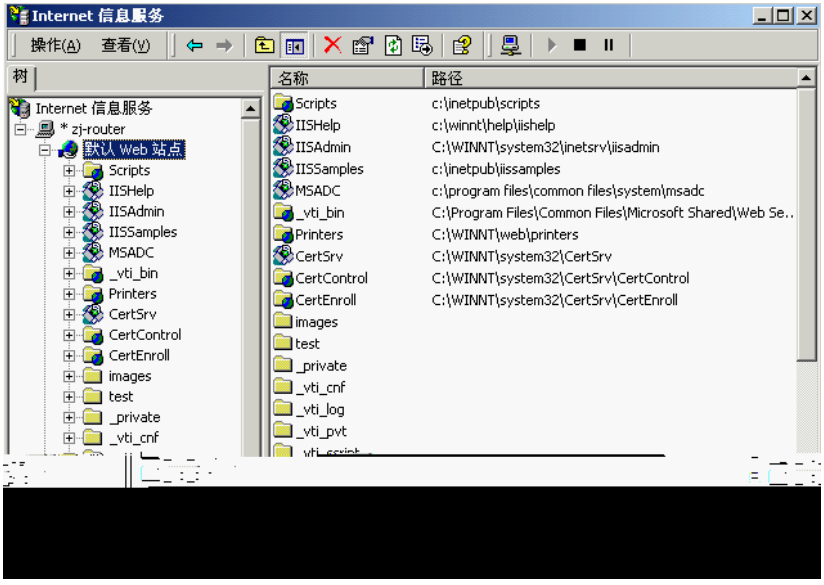


—Active Server Pages‖ — ‖ —
‖ — ‖ — ‖ —Internet ‖

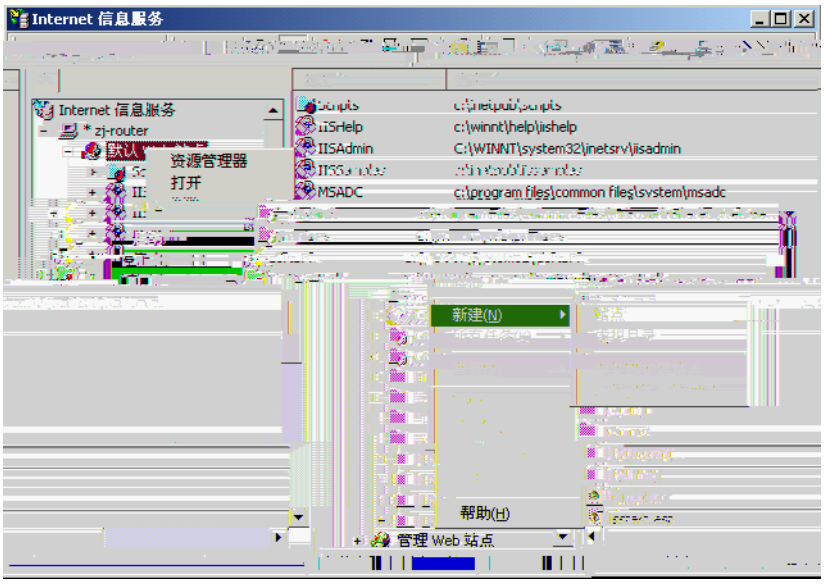


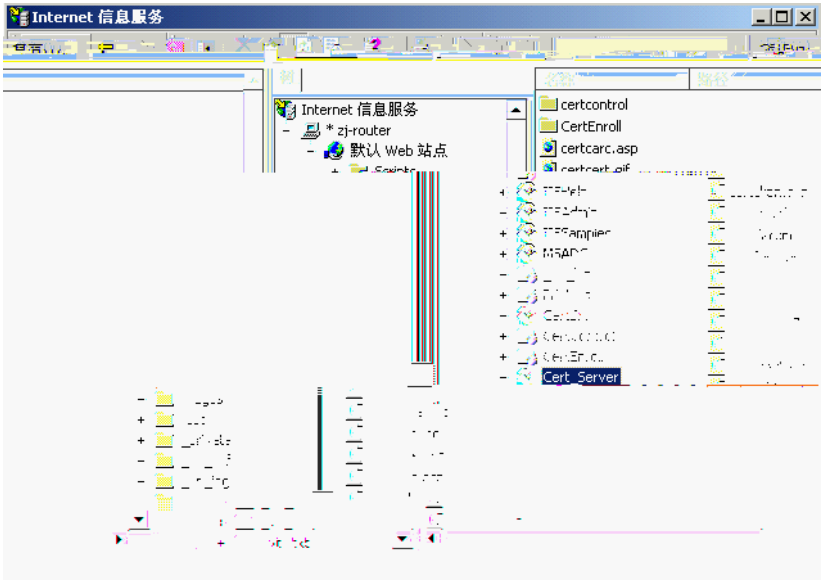
— ‖

Internet



Web


Internet 信息服务
Internet 信息服务
* zj-router
资源管理器
打开
IISAdmin
C:\WINNT\system32\inetsrv\iisadmin
MSADC
c:\program files\common files\system\msadc
新建(N)
帮助(H)
管理 Web 站点

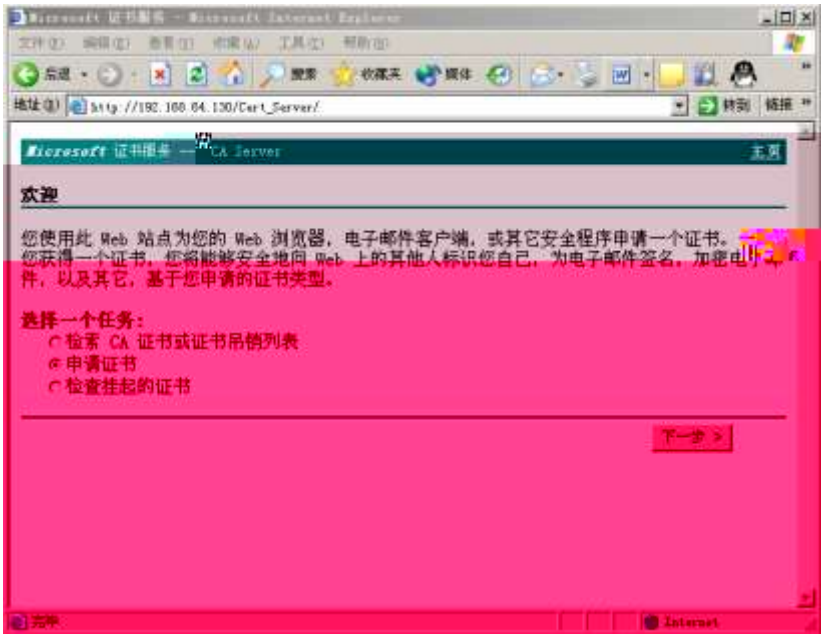


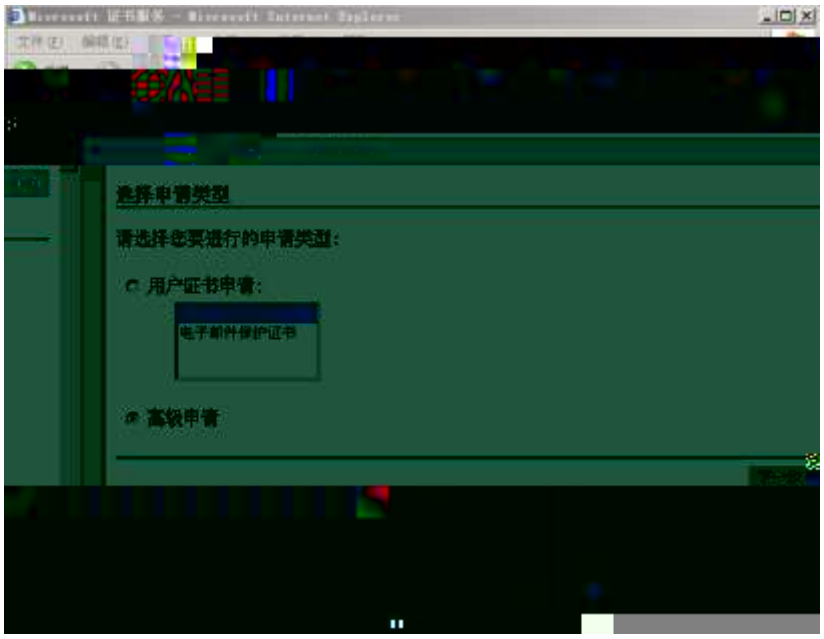
CA server Internet 127.0.0.1/Cert_Server

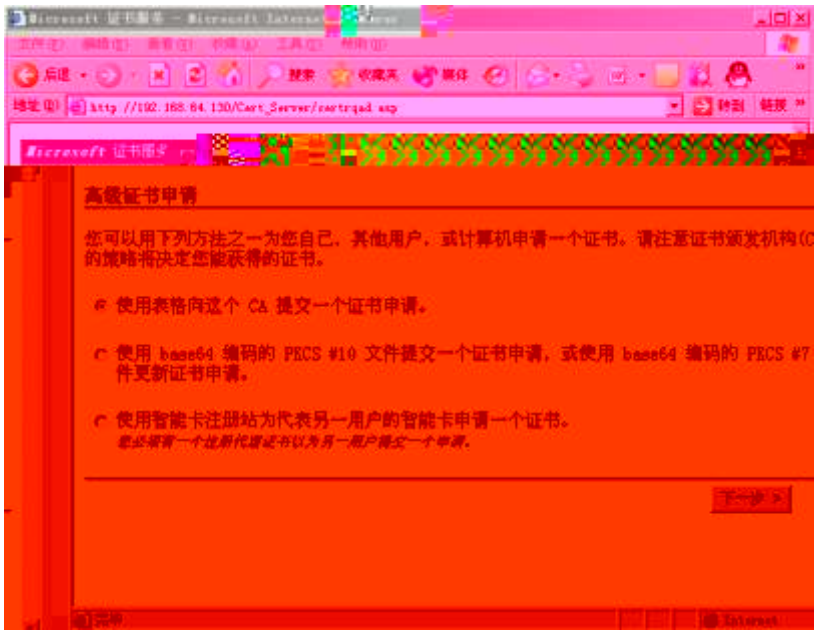
11.2.3

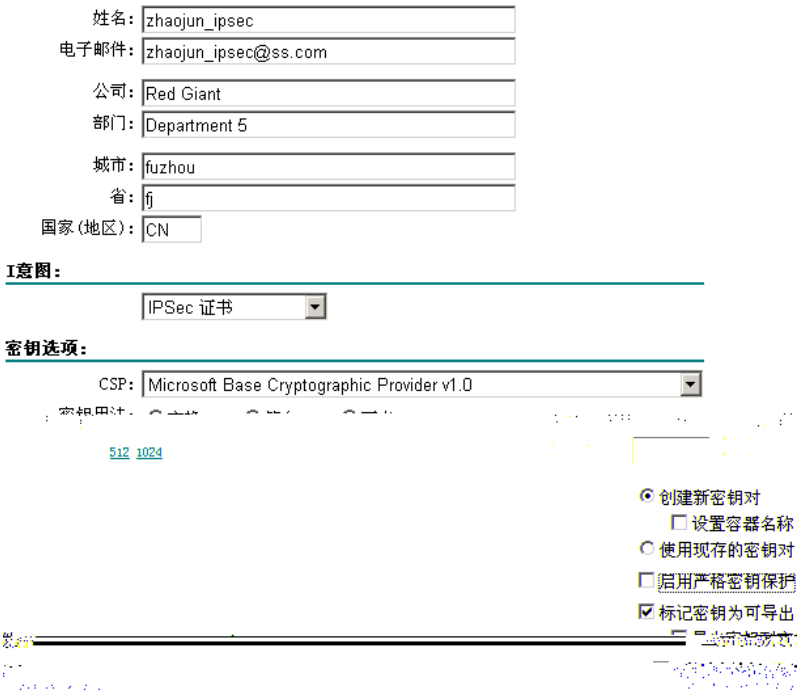
PC CA server ip 192.168.64.130

PC Internet 192.168.64.130/Cert_Server,


Microsoft 证书服务 -- CA Server
主页
欢迎
您使用此 Web 站点为您的 Web 浏览器，电子邮件客户端，或其它安全程序申请一个证书。
您获得一个证书，您将能够安全地向 Web 上的其他人标识您自己，为电子邮件签名，加密电子邮
件，以及其它，基于您申请的证书类型。
选择一个任务：
检索 CA 证书或证书吊销列表
申请证书
检查挂起的证书
下一步 >
完毕
Internet


选择申请类型
请选择您要进行的申请类型：
用户证书申请：
电子邮件保护证书
高级申请



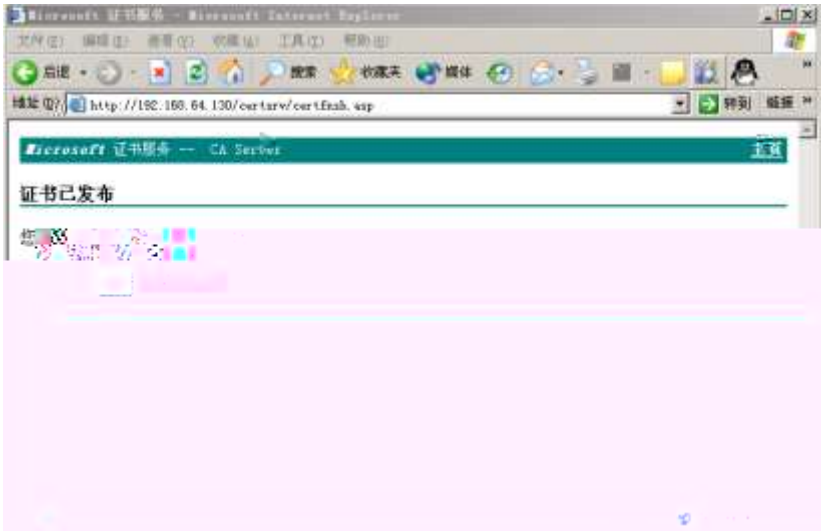


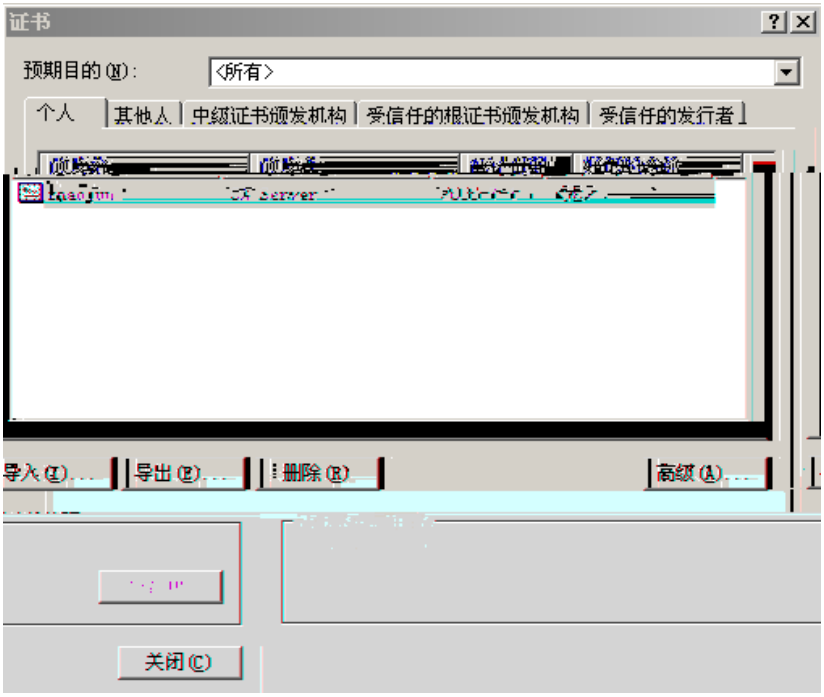
RSA CA server

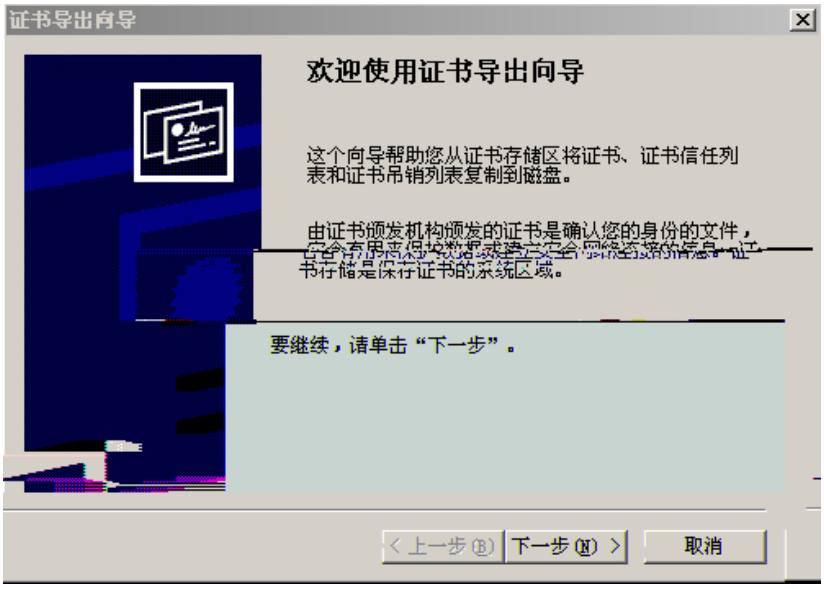

Microsoft 证书服务 -- CA Server
主页
欢迎
您使用此 Web 站点为您的 Web 浏览器，电子邮件客户端，或其它安全程序申请一个证书。一旦您获得一个证书，您将能够安全地向 Web 上的其他人标识您自己，为电子邮件签名，加密电子邮件，以及其它，基于您申请的证书类型。
选择一个任务：
检索 CA 证书或证书吊销列表
申请证书
检查挂起的证书
下一步 >
完毕
Internet

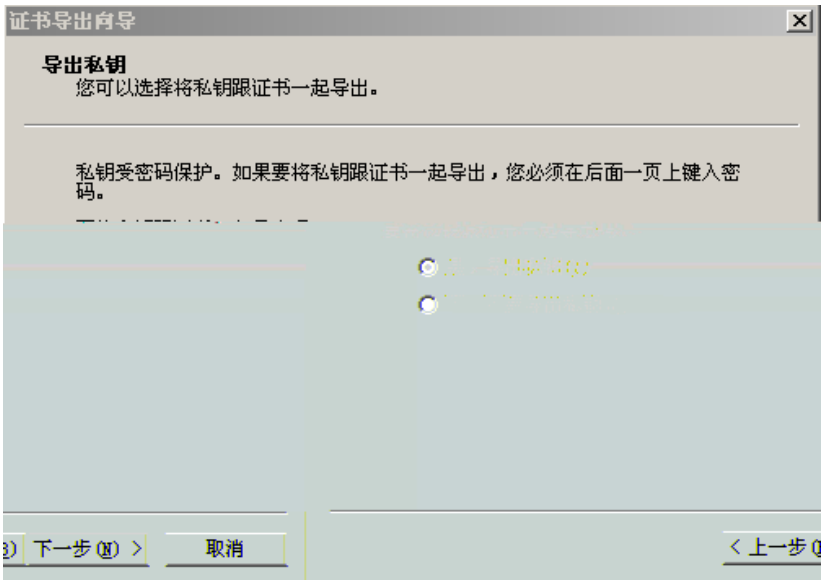
CA

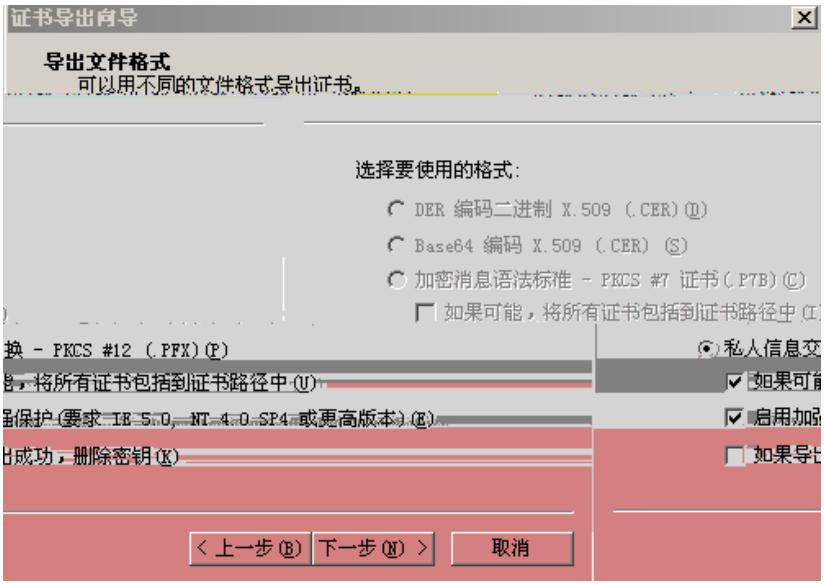

Microsoft 证书服务 -- CA Server
主页
检查挂起的证书申请


Microsoft 证书服务 -- CA Server
主页
证书已发布


证书
预期目的(N):
<所有>
个人
其他人
中级证书颁发机构
受信任的根证书颁发机构
受信任的发行者
导入(I)...
导出(E)...
删除(R)
高级(A)...
关闭(C)

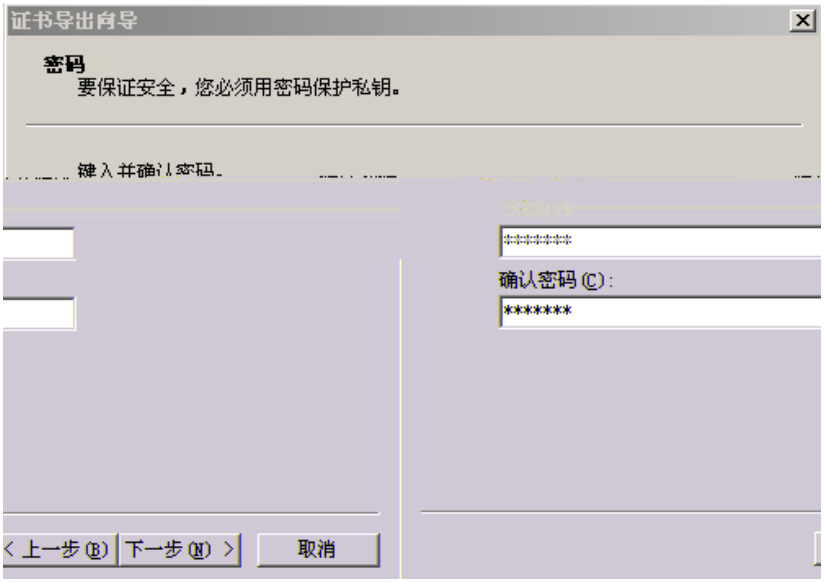

证书导出向导
欢迎使用证书导出向导
这个向导帮助您从证书存储区将证书、证书信任列表和证书吊销列表复制到磁盘。
由证书颁发机构颁发的证书是确认您的身份的文件，
书存储是保存证书的系统区域。
要继续，请单击“下一步”。
< 上一步(B)
下一步(N) >
取消

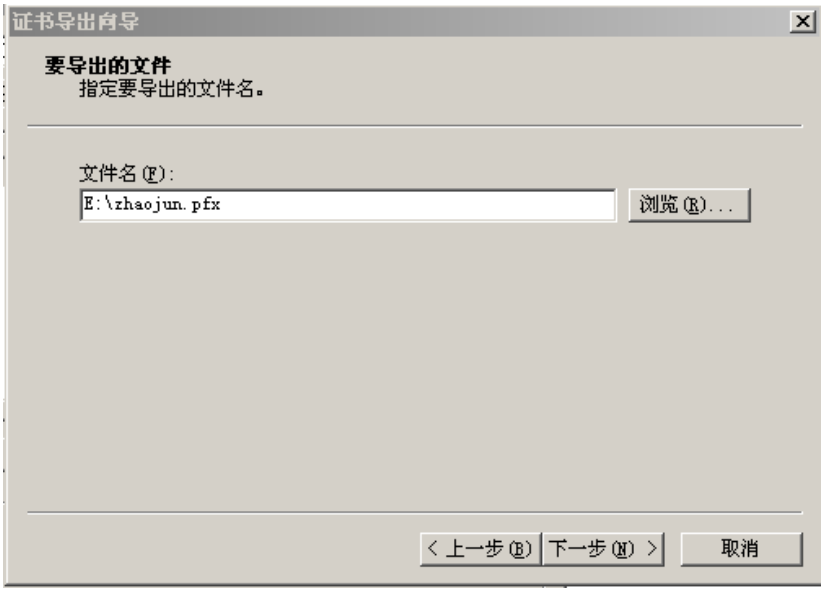

证书导出向导
导出私钥
您可以选择将私钥跟证书一起导出。
私钥受密码保护。如果要将私钥跟证书一起导出，您必须在后面一页上键入密码。
下一步(N) >
取消

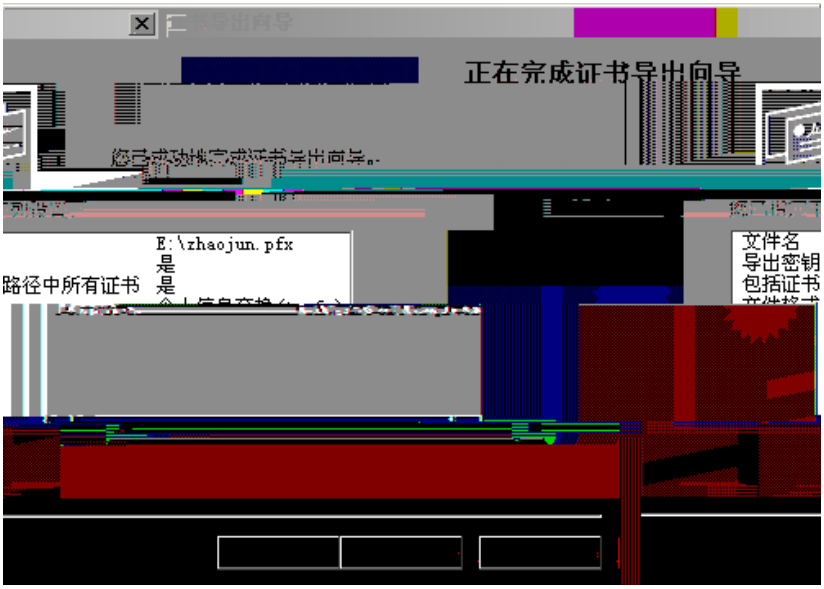

证书导出向导
导出文件格式
可以用不同的文件格式导出证书。
选择要使用的格式:
DER 编码二进制 X.509 (.CER)(D)
Base64 编码 X.509 (.CER) (S)
加密消息语法标准 - PKCS #7 证书(.P7B)(C)
如果可能，将所有证书包括到证书路径中(I)
换 - PKCS #12 (.PFX)(P)
私人信息交
包括所有证书包括到证书路径中(U)
如果可能
强保护(要求 IE 5.0, NT 4.0 SP4 或更高版本)(E)
启用加强
出成功，删除密钥(K)
如果导出
< 上一步(B)
下一步(N) >
取消

— Ⅱ

CA

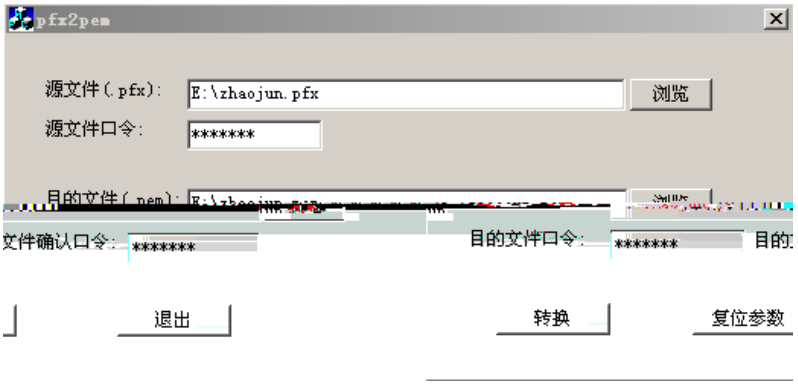

证书导出向导
密码
要保证安全，您必须用密码保护私钥。
确认密码(C):
****
< 上一步(B)
下一步(N) >
取消


证书导出向导
要导出的文件
指定要导出的文件名。
文件名(F):
E:\zhaojun.pfx
浏览(R)...
< 上一步(B)
下一步(N) >
取消



pfx pem

pfx2pem



pem Windows

pem

IE

6.3.1.1

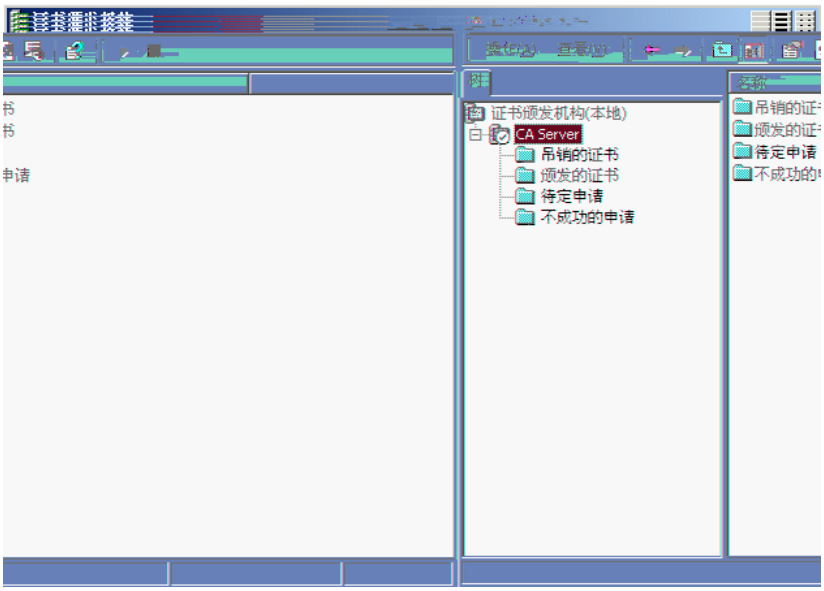
11.2.4 CRL URL

crl

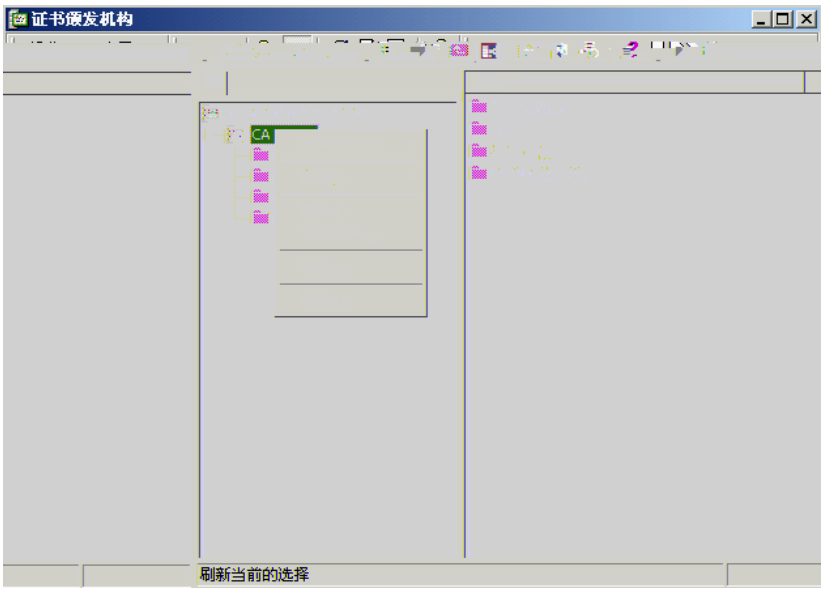
http://%SERVER_DNS_NAME%/CertEnroll/%CA_NAME%%CRL_SUFFIX%.crl

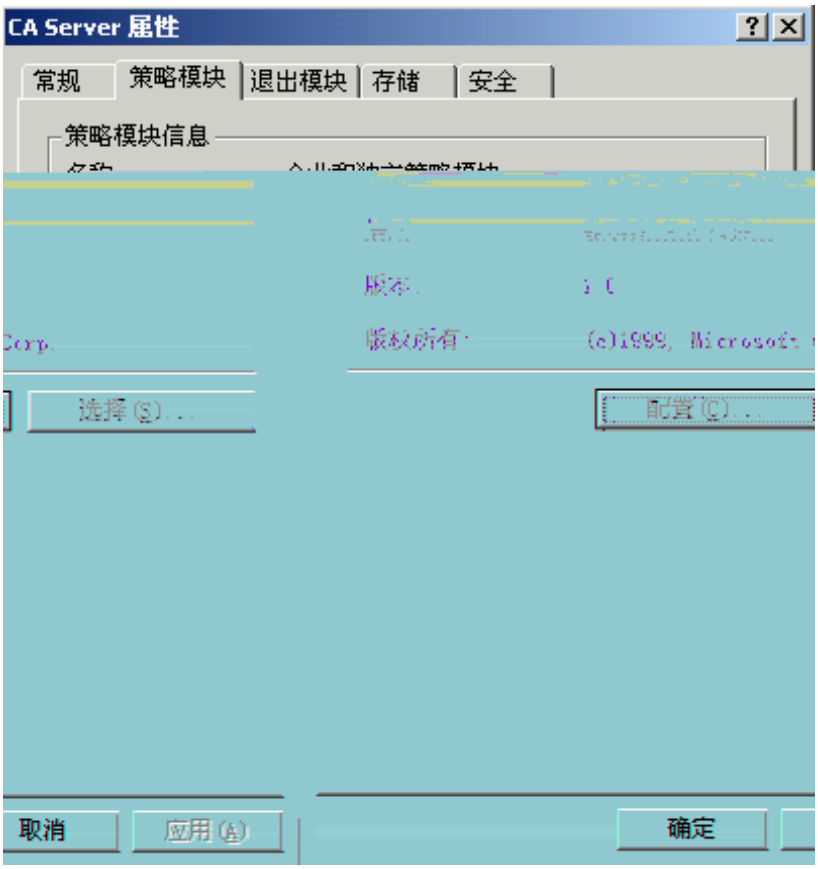
file://\\%SERVER_DNS_NAME%\CertEnroll\%CA_NAME%%CRL_SUFFIX%.crl

%SERVER_DNS_NAME% ip
ip CA server

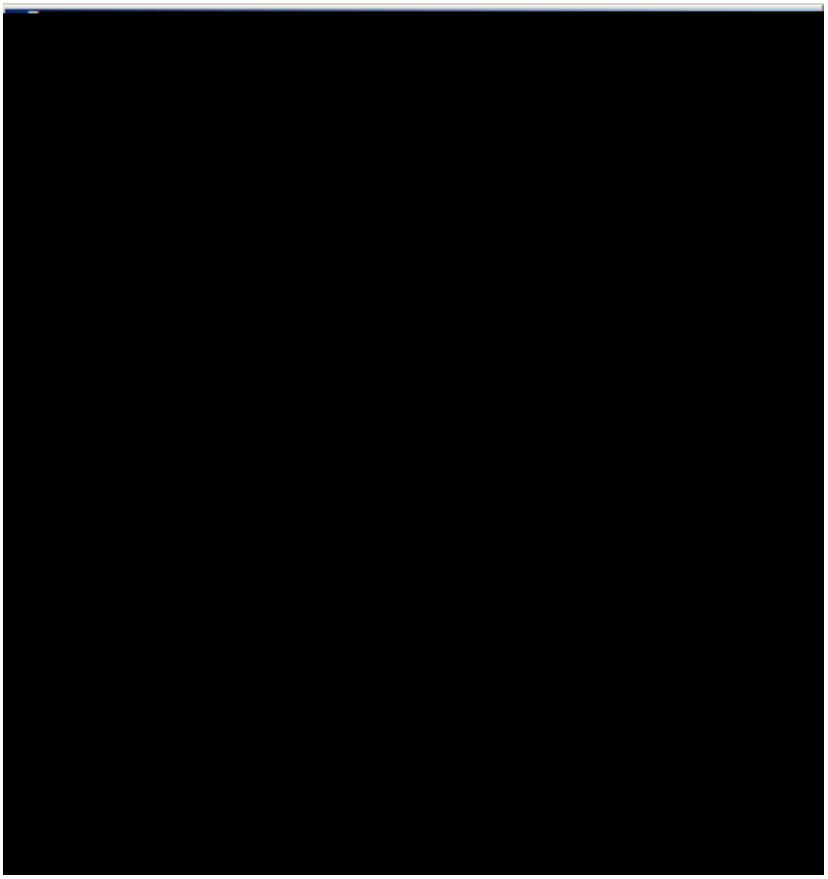


CA Server

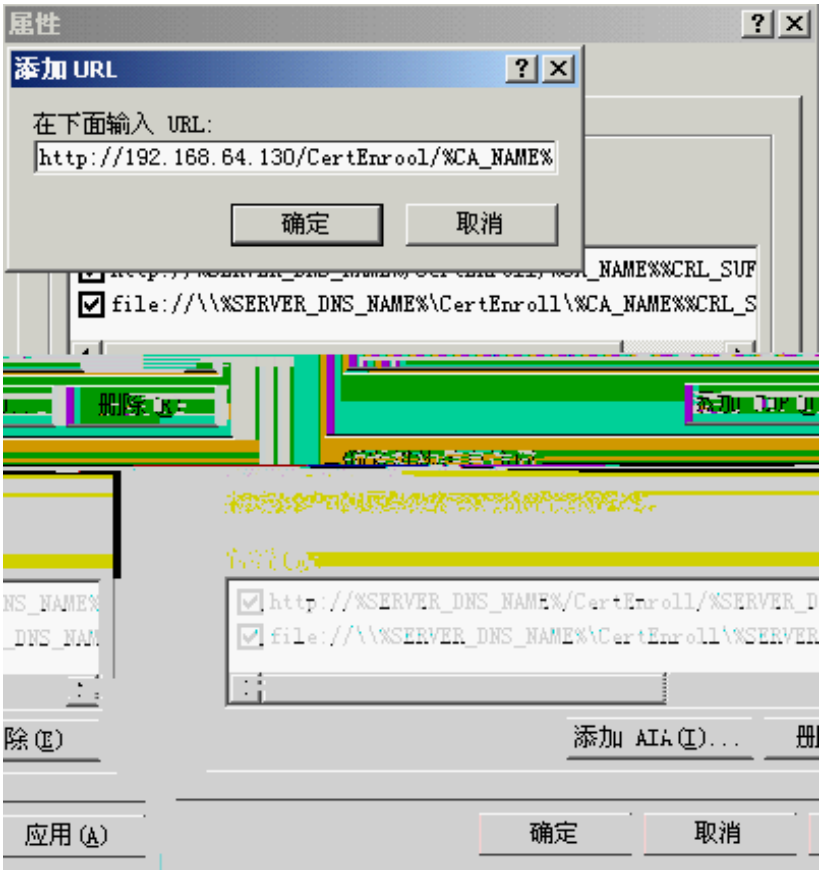




X.509



CDP



CRL

ip

http://192.168.64.130/CertEnroll/%CA_NAME%%CRL_SUFFIX%.crl

file:\\192.168.64.130\CertEnroll\%CA_NAME%%CRL_SUFFIX%.crl

http://www.ruijie.com.cn/CertEnroll/%CA_NAME%%CRL_SUFFIX%.crl

file://\\www.ruijie.com.cn\CertEnroll\%CA_NAME%%CRL_SUFFIX%.crl

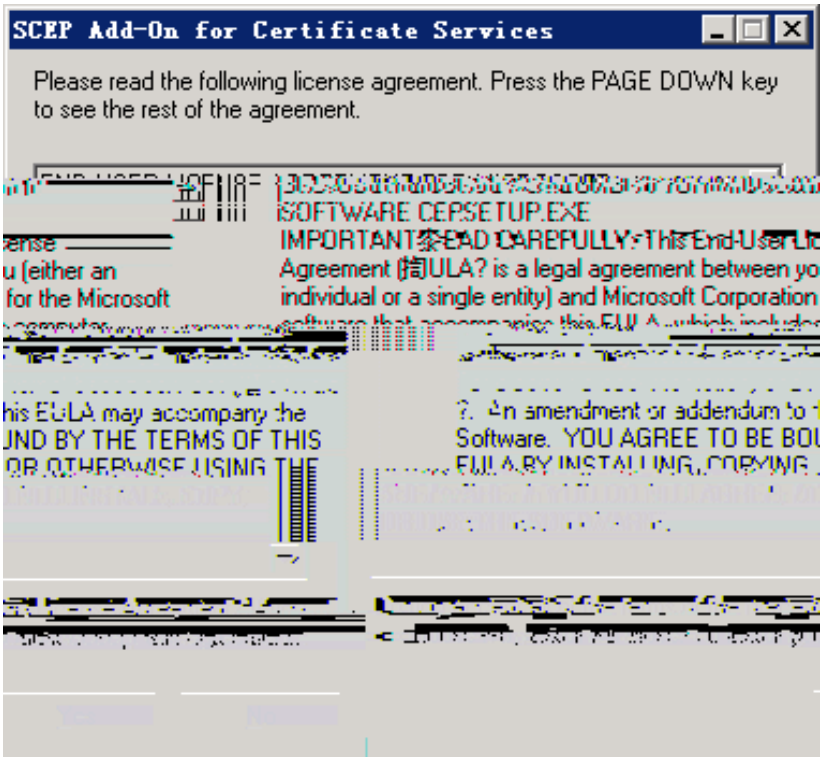
CRL http
CA server CRL CRL

11.2.5 SCEP

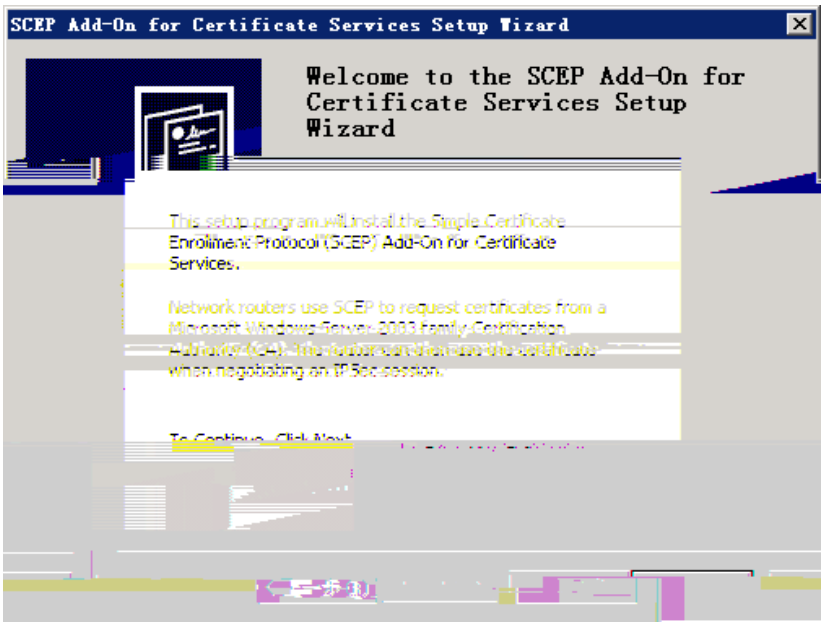
Windows Server 2003 SCEP
http://go.microsoft.com/fwlink/?LinkId=32060


SCEP Add-On for Certificate Services
Are you sure you want to install Simple Certificate Enrollment Protocol (SCEP) Add-On for Certificate Services?

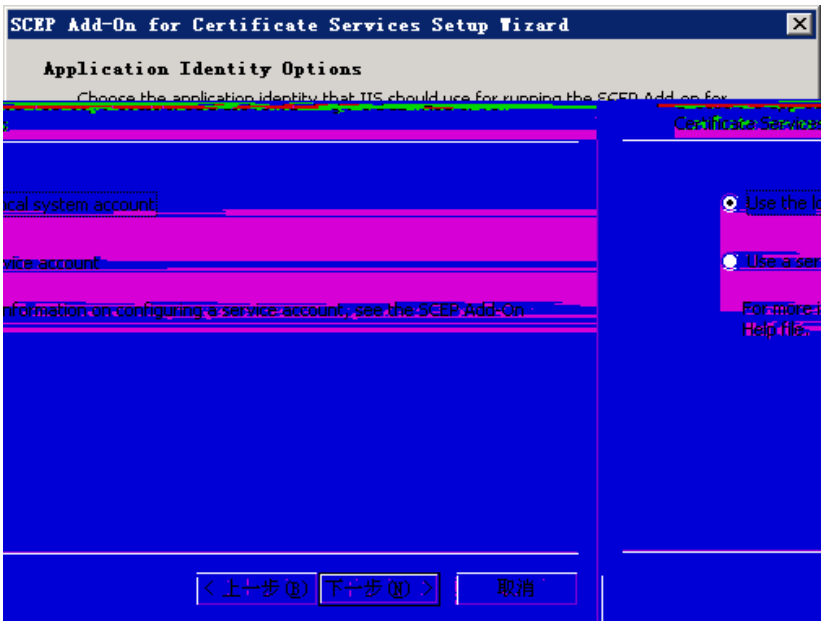
—Yes‖


SCEP Add-On for Certificate Services
Please read the following license agreement. Press the PAGE DOWN key to see the rest of the agreement.
SOFTWARE CEPSETUP.EXE
IMPORTANT:READ CAREFULLY: This End-User
Agreement (ULA? is a legal agreement between
individual or a single entity) and Microsoft Corporation
Software. YOU AGREE TO BE

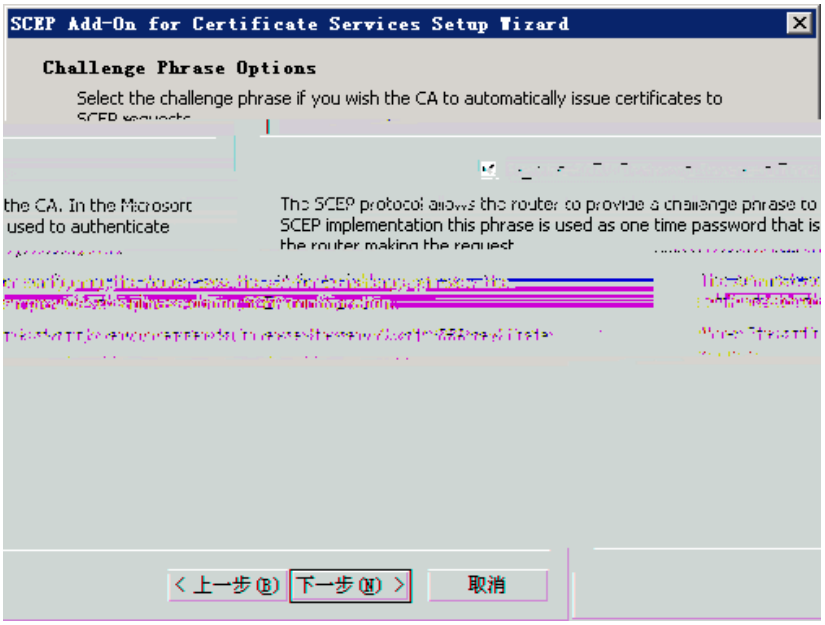
— ‖


SCEP Add-On for Certificate Services Setup Wizard
Welcome to the SCEP Add-On for Certificate Services Setup Wizard
This setup program will install the Simple Certificate Enrollment Protocol (SCEP) Add-On for Certificate Services.
Network routers use SCEP to request certificates from a Microsoft Windows Server 2003 family Certification Authority (CA). This enables routers to obtain certificates when negotiating an IPSec session.

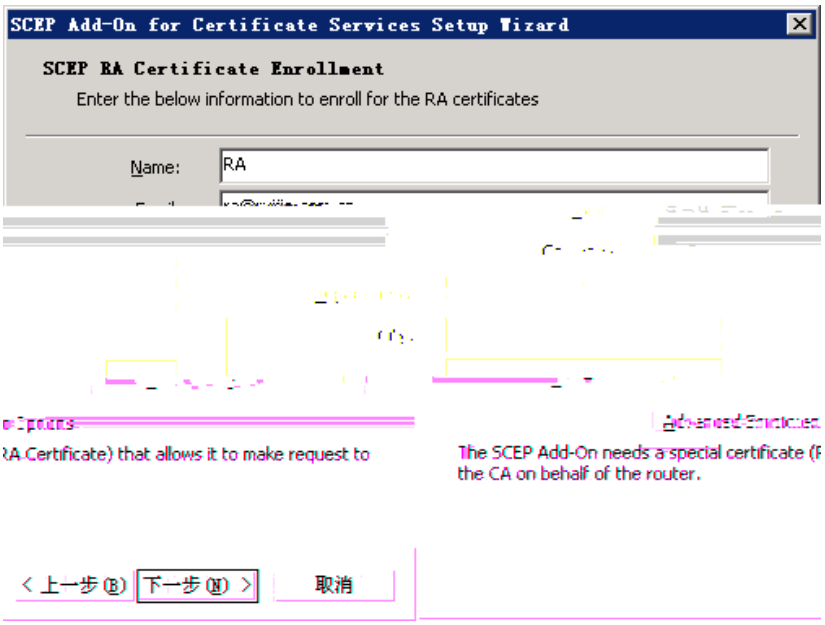
— ‖ — ‖



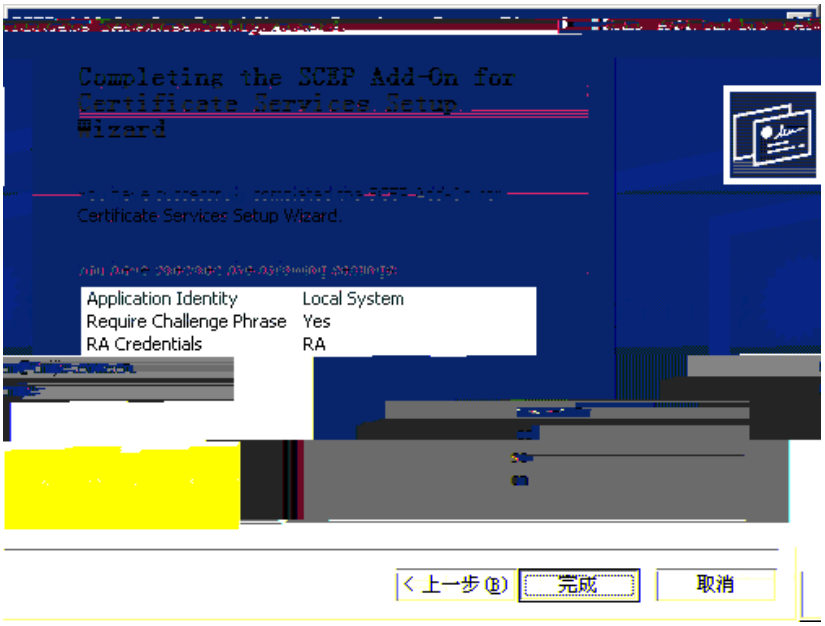
— SCEP Ⅱ CA
http://ca/certsrv/mscep/msdep.dll —
Ⅱ — Ⅱ 60 — Ⅱ



— Ⅱ — Ⅱ


SCEP Add-On for Certificate Services Setup Wizard
SCEP RA Certificate Enrollment
Enter the below information to enroll for the RA certificates
Name:
RA
RA Certificate) that allows it to make request to
The SCEP Add-On needs a special certificate (
the CA on behalf of the router.
< 上一步(B)
下一步(N) >
取消

—


Completing the SCEP Add-On for
Certificate Services Setup
Wizard
Certificate Services Setup Wizard.
Application Identity
Local System
Require Challenge Phrase
Yes
RA Credentials
RA
< 上一步(B)
完成
取消

SCEP URL


SCEP Add-On for Certificate Services Setup Wizard
Setup Successful. URL to use for SCEP enrollment is http://ruijie-ca/certsrv/mscep/mscep.dll.
确定

11.3

11.3.1

CA CA RGOS
— Ⅱ SCEP

CA CA

SCEP SCEP CA

CA

16 DER

CRL

CRL CRL HTTP CRL

11.3.1.1

PEM CA

CA

CA CA

PEM Windows

1. -----BEGIN CERTIFICATE-----‖ -----END CERTIFICATE-----‖
-----BEGIN RSA PRIVATE KEY-----‖ -----END RSA PRIVATE KEY-----‖ PKCS12

2. CA CA subject issurer subject issurer CA

subject issurer

1 CA

1

1

	CA CA ‖begin‖ ‖end‖ write FLASH CA Fingerprint CA CA hmac CA RGOS SHA-1

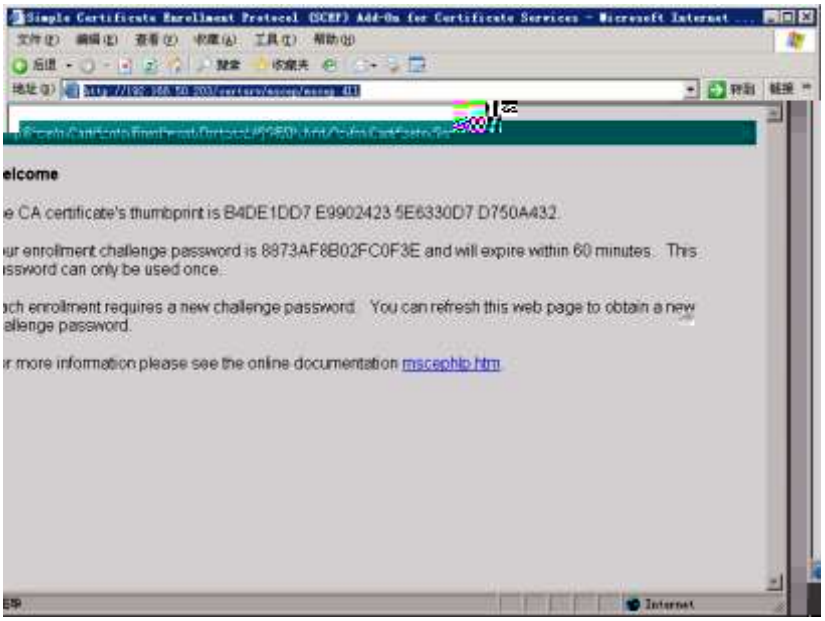
DER 16

show running DER

show crypto pki cert

trustpoint

Ruijie (ca-trustpoint)# **enrollment auto-enroll** *percentage*



8. CA

router(config)#crypto pki enroll CA

11.3.1.3

-----END CERTIFICATE REQUEST-----
// -----BEGIN CERTIFICATE REQUEST----- -----END CERTIFICATE REQUEST-----
PKCS10 CA

% Enter PEM-formatted CA certificate.

1.

show running

CA

1. CRL
FLASH

CRL URL no

Ruijie(ca-trustpoint)# **crl query** *url_string*	CRL URL

1. *url_string* http // 80

11.3.2

show running

copy

tft flash config.text

crypto pki import pem terminal

11.4

Ruijie# **show crypto pki certificates** *CA_name* [**detail**]	CA

show crypto pki certificates

Ruijie#

CRL	**crypto pki revocation-check none**, **show crypto pki crl**

Ruijie# **debug crypto pki event**	
Ruijie# **debug crypto pki error**	

12 AAA

AAA

12.1 AAA

AAA Authentication Authorization and Accounting

AAA

AAA

RADIUS TACACS+ Local

AAA

AAA

AAA

AAA

AAA

AAA

12.1.1 AAA

AAA

12.2 AAA

AAA

12.2.1 AAA

AAA AAA AAA

AAA **aaa new-model**

RADIUS

aaa authentication

12.2.2 AAA

AAA AAA

AAA

Step 1 **aaa new-model**	AAA

12.2.3 AAA

AAA

Step 1 **no aaa new-model**	AAA

12.2.4

AAA

AAA

RADIUS	2	RADIUS
(Login)	3	
	4	
	5	
RADIUS	6	
RADIUS	7	

AAA

12.3

12.3.2

AAA 2 R1 R2 RADIUS
NAS Telnet

DOT1X IEEE802.1x

Web

Login NAS CLI
Enable NAS CLI CLI
PPP PPP DOT1X IEEE802.1x
Web ePortal

12.3.4 AAA

AAA

aaa new-model AAA

RADIUS TACACS+

RADIUS TACACS+

aaa authentication

DOT1X TACACS+

12.3.5 AAA Login

list-name *method*

ERROR

FAIL( )

none

RADIUS (TIMEOUT) aaa

authentication login default group radius none

	none **none** **none** **none**

Step 1 **local**	
Step 2 **none**	

Step 6	**configure terminal**	
Step 7	**line vty** *line-num*	
Step 8	**login authentication** {**default** | *list-name*}	
Step 9	**end**	
Step10	**show running-config**	

12.3.5.2 RADIUS Login

RADIUS Login RADIUS RADIUS

Step 1	**configure terminal**	
Step 2	**aaa new-model**	AAA
Step 3	**radius-server host** *ip-address* [**auth-port** *port*] [**acct-port** *port*]	RADIUS
Step 4	**end**	
Step 5	**show radius server**	RADIUS

RADIUS RADIUS RADIUS
RADIUS RADIUS

RADIUS

Step 1	**configure terminal**	
Step 2	**aaa new-model**	AAA
Step 3	**aaa authentication login** {**default** | *list-name*} **group radius**	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**	

12.3.6 AAA Enable

AAA Enable

Telnet (NAS)
CLI CLI 0~15
show

RADIUS

12.3.6.1 Enable

Enable
1 Enable

Step 1	**configure terminal**	
Step 2	**username** *name* [**password** *password*]	
Step 3	**username** *name* [**privilege** *level*]	
Step 4	**end**	
Step 5	**show running-config**	

Enable

Step 1	**configure terminal**	
Step 2	**aaa new-model**	AAA
Step 3	**aaa authentication enable default local**	
Step 4	**end**	
Step 5		

Step 4	**end**	
Step 5	**show aaa method-list**	
Step 6	**show running-config**	

12.3.7 PPP AAA

PPP

ISDN NAS PPP

IEEE802.1x 802.1x

12.3.9 web AAA

Web

web web

Step 1	**configure terminal**	
Step 2	**aaa new-model**	AAA
Step 3	**aaa authentication web** {**default** | *list-name*} *method1* [*method2*...]	web RADIUS

Web web

12.3.10 web

IP IP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)#	
Step 3	Ruijie(config)# **show web-auth local-portal**	Web

( )

12.3.11

RADIUS+

web RADIUS IP 192.168.217.64
RADIUS

12.3.12

IP
AAA Login

none

RADIUS IP 192.168.217.64
RADIUS tty 1-4
tty vty

12.4

AAA AAA

12.4.1

AAA

Exec
Command
Network

Exec NAS CLI
0~15 NAS CLI

	TACACS+ TACACS+

12.4.2

AAA

AAA AAA AAA

AAA

AAA

Step 5 **authorization exec** {**default** | *list-name*}

Step 5	**show aaa method-list**	
Step 6	**configure terminal**	
Step		

12.4.5 AAA Network

PPP SLIP Network
Network Network RADIUS
TACACS+ RADIUS TACACS+

	802.1X AAA 802.1X 802.1X

AAA Network

Step 1	**configure terminal**	
Step 2	**aaa new-model**	AAA
Step 3	**aaa authorization network** {**default** | *list-name*} *method1* [*method2*...]	

list-name *method*
ERROR
FAIL( )
none

Exec NAS CLI
NAS CLI

	TACACS+ TACACS+

12.5.2

AAA

AAA AAA AAA

Network RADIUS
TACACS+ Exec RADIUS TACACS+ Command
TACACS+ RADIUS RADIUS TACACS+
TACACS+

AAA Exec
AAA

12.5.3 AAA Exec

Exec NAS CLI
NAS CLI Start CLI
Stop

	NAS Login Exec Login none Exec Start Stop

AAA Exec

Step 1 **configure terminal**

12.5.4 AAA Network

Network IP
Network RADIUS

RADIUS RADIUS

AAA Network

Step 1	**configure terminal**	
Step 2	**aaa new-model**	AAA
Step 3	**aaa accounting network** {**default** | *list-name*} **start-stop** *method1* [*method2*...]	

list-name *method*
ERROR
FAIL( )
none

12.5.4.1 RADIUS Network

RADIUS Network RADIUS RADIUS
RADIUS

RADIUS RADIUS

Step 3	**aaa accounting network** {**default** | *list-name*} **start-stop group radius**	RADIUS

12.5.4.2 Network

RADIUS Network

Step 5	**end**	

vrf

12.8 Login

Login Login

Login

Step 1	**configure terminal**	
Step 2	**aaa new-model**	AAA
Step 3	**aaa local authentication attempts** *<1-2147483647>*	login
Step 4	**aaa local authentication lockout-time** *<1-432002147483647>*	login
Step 5	**show aaa user lockout {all | user-name** *<word>*}	
Step 6	**clear aaa local user lockout** {**all** | **user-name** *<word>*}	
Step 7	**end**	

Login 3 15

AAA

AAA

AAA

AAA

	AAA 802.1x	IEEE802.1x	IEEE802.1x

AAA

AAA

1. AAA
2. AAA
3. AAA
4.
5.
6.

32

12.8.1.1 AAA

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

12.8.1.3 AAA

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

12.8.1.4

1 ". „ "\" „@ „

2 „@" " " „@" 1 „@"
a@b@c@d a@b@c d

3 \„ \" " " „\" „\"
a\b\c\d b\c\d a

4 0 ©#e ‰ð eÀŽóö

AAA

AAA

AAA

1. AAA
802.1x AAA 802.1X
dot1x authentication *authen-list-name* **dot1x accounting** *acct-list-name*
authen-list-name *acct-list-name* AAA

2. AAA
default AAA
AAA

3. AAA

4. AAA AAA
AAA

5.
domain.com domain.com.cn aaa@domain.com
domain.com domain.com.cn

AAA

AAA

13

13.2 RADIUS

RADIUS

AAA AAA “AAA ”

aaa authentication RADIUS **aaa authentication**
“ ”

“ ”

RADIUS RADIUS

RADIUS

RADIUS

23	login privilige	42
24	limit to user number	50

ID

ID		TYPE
1	max down-rate	76
2	qos	77
3	user ip	3
4	vlan id	4
5	version to client	5
6	net ip	6
7	user name	7

13.3 RADIUS

debug radius event

14 TACACS+

14.1 TACACS+

TACACS+ TACACS RFC 1492 Terminal Access Controller Access Control System Client-Server TACACS AAA TACACS+ TACACS+

TACACS+

TACACS+

4	8	16	24	32 bit
Major	Minor	Packet type	Sequence no.	Flags
Session ID				
Length				

Major Version — TACACS+

Minor Version — TACACS+

Packet Type —
TAC_PLUS_AUTHEN = 0x01
TAC_PLUS_AUTHOR = 0x02
TAC_PLUS_ACCT = 0x03

Sequence Number — TACACS+ 1 1
TACACS+ Daemon

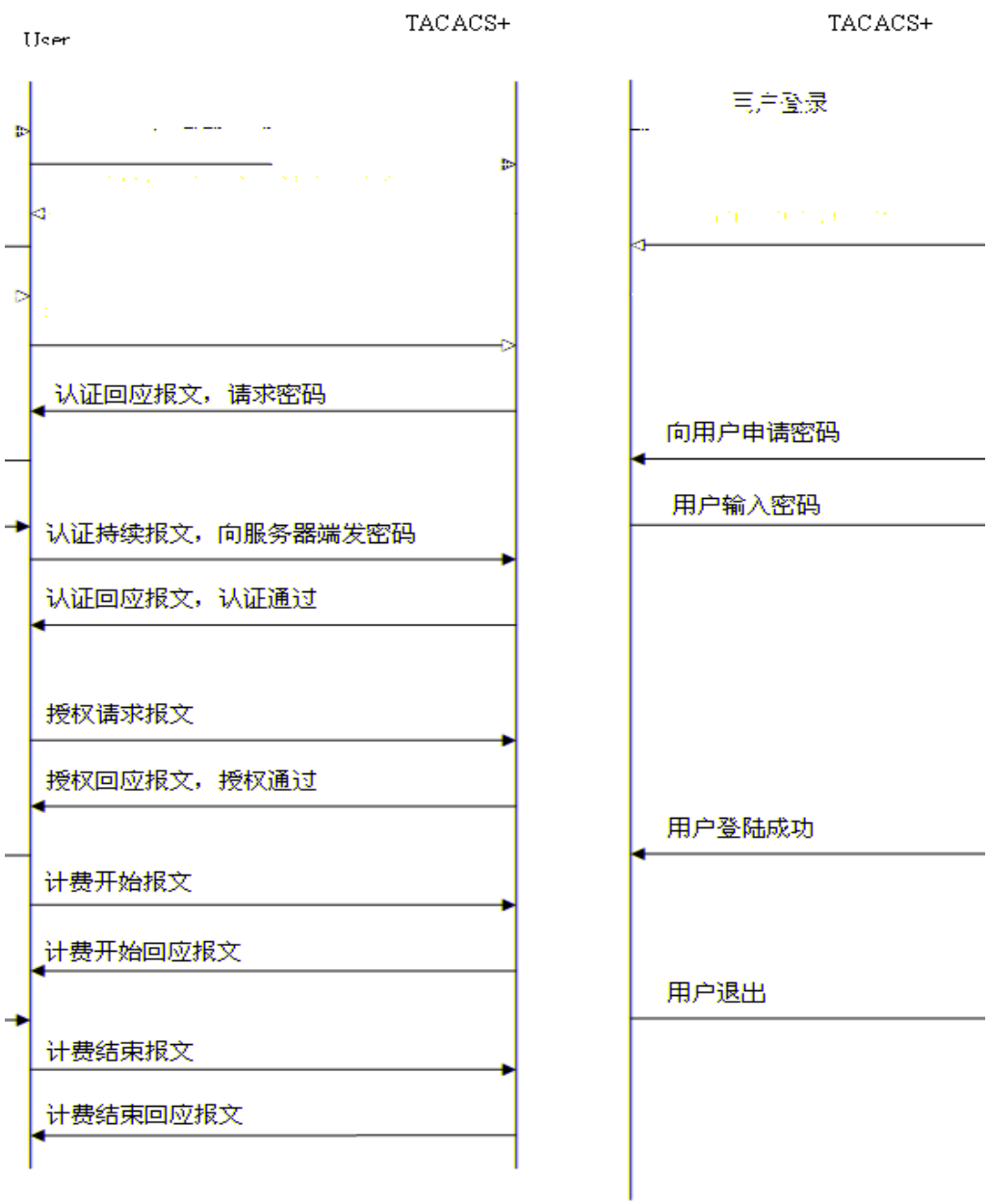
Flags — flag Flag

Session ID — TACACS+ ID

Length — TACACS+

14.2 TACACS+

TACACS+ TACACS+
TACACS+



TACACS+ TACACS+

TACACS+

TACACS+

TACACS+ TACACS+

TACACS+

TACACS+

TACACS+ TACACS+

TACACS+

TACACS+ TACACS+

TACACS+

TACACS+

TACACS+ TACACS+

TACACS+

ACACS+

14.3 TACACS+

TACACS+

aaa new-model AAA TACACS+ AAA
aaa new-model AAA ‖

tacacs-server host tacacs+

tacacs-server key key

tacacs-server timeout

aaa authentication TACACS+
a**aa authentication** — ‖

aaa authorization TACACS+
aaa authorization — ‖

aaa accounting TACACS+
aaa accounting — ‖

14.3.1 TACACS+

TACACS+ TACACS+
TACACS+

14.4.1 Login TACACS+

aaa

tacacs+ server

tacacs+

:

login tacacs+

14.4.2 ENABLE TACACS+

aaa

tacacs+ server

tacacs+ server group

tacgroup1

enable tacacs+

TACACS+

14.4.4 15 Commands TACACS+

aaa

tacacs+ server

tacacs+

:

enable tacacs+

15 Web

15.1 Web

15.1.1 Web

Web

Web

HTTP Web Web

Web

15.1.2 Web

Web HTTP HTTP

15.1.2.1 HTTP

HTTP HTTP HTTP
IE
HTTP HTTP

HTTP HTTP
HTTP

Web HTTP
HTTP
HTTP Web Web

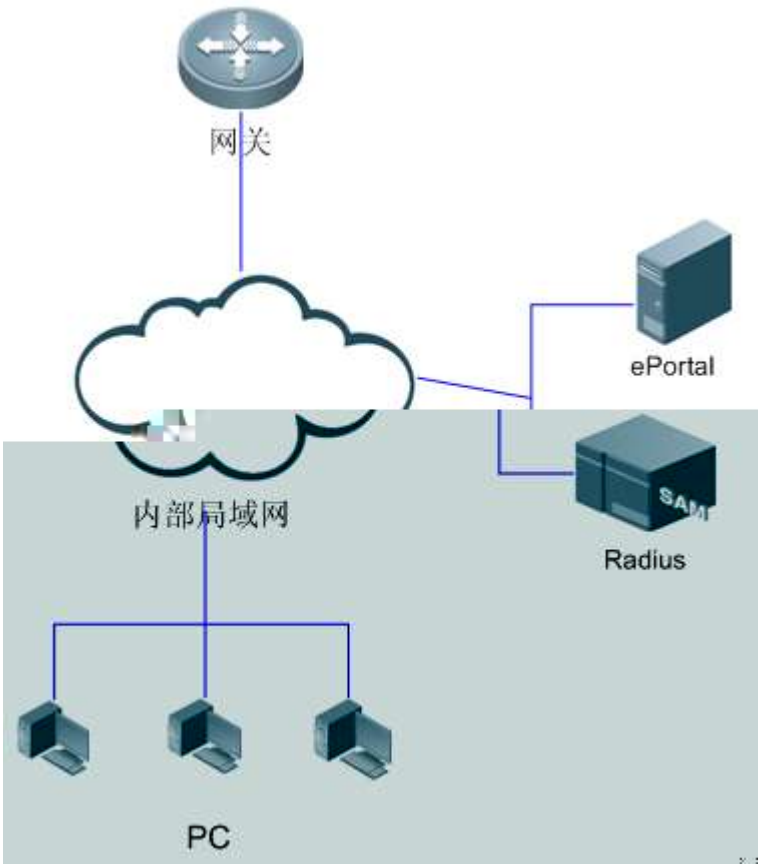
15.1.2.2 HTTP

HTTP HTTP GET HEAD
200 302 302
HTTP GET HEAD

HTTP Web HTTP HTTP 302
HTTP
HTTP GET HEAD 302 302

15.1.3

Web WEB



5 Web

Web

1. HTTP
HTTP

2. Web (
)

3. Web Web ePortal RADIUS
Web
ePortal
radius

Web

1. HTTP Web

2. Web

3. Web Aɨp

15.1.4

HTTP HTTP 1.1

15.3 Web

Web Web
Web Web
Web

HTTP

SNMP

Web

portal

15.3.1 HTTP

Web HTTP IP
HTTP

HTTP

HTTP

HTTP

15.3.2 HTTP

Web HTTP
Web
Web

HTTP HTTP URL

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **http redirect homepage** *url-string*	URL *url-string* http:// https:// 255
Step 3	Ruijie(config)# **show http redirect**	HTTP

no http redirect homepage

http://www.web-auth.net/login.html

	Homepage portal url http://ip:8081/login.html

15.3.3

web Web

web-auth

IP 176.10.0.1 SNMP SNMP Community web-auth SNMP-Inform

SNMP SNMPv2
SNMP SNMPv3
SNMP Community

15.4 Web

Web

Web

HTTP

HTTP

IP

IP-MAC

url

tr069

url

15.4.1 HTTP

HTTP

HTTP

80 HTTP

HTTP

Step 1	Ruijie# **configure terminal**	
Step 2		

8080 HTTP

80 HTTP

	22 23 53 80 HTTP 1000 TCP

15.4.2 HTTP

PC HTTP HTTP
Web HTTP
HTTP

HTTP HTTP
HTTP 1
HTTP 255

HTTP

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **http redirect session-limit** *session-num* [**port** *port-session-num*]	

	Web HTTP HTTP Web

15.4.3

HTTP TCP

TCP

172.16.x.x

IP 176.10.0.1

15.4.7

xx 30s
yy bit/s

— Ⅱ

xx 30s yy bit/s

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **web-auth offline-detect flow interval** *xx* **flow** *yy*	

no web-auth offline-detect flow

#

15.4.8 IP-MAC

IP MAC IP MAC IP
IP

Step 1	Ruijie# **configure terminal**	

Step 2	Ruijie(config)# **web-auth user-mode {ip|mac-ip}**	ip mac-ip ip

mac ip

mac ip

15.4.9 url

web url

url

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **web-auth redirect** *url-string*	url *url-string* http:// https:// 255

no web-auth redirect

web-auth redirect

15.5

portal radius portal

Web

portal

EG Web

15.5.1

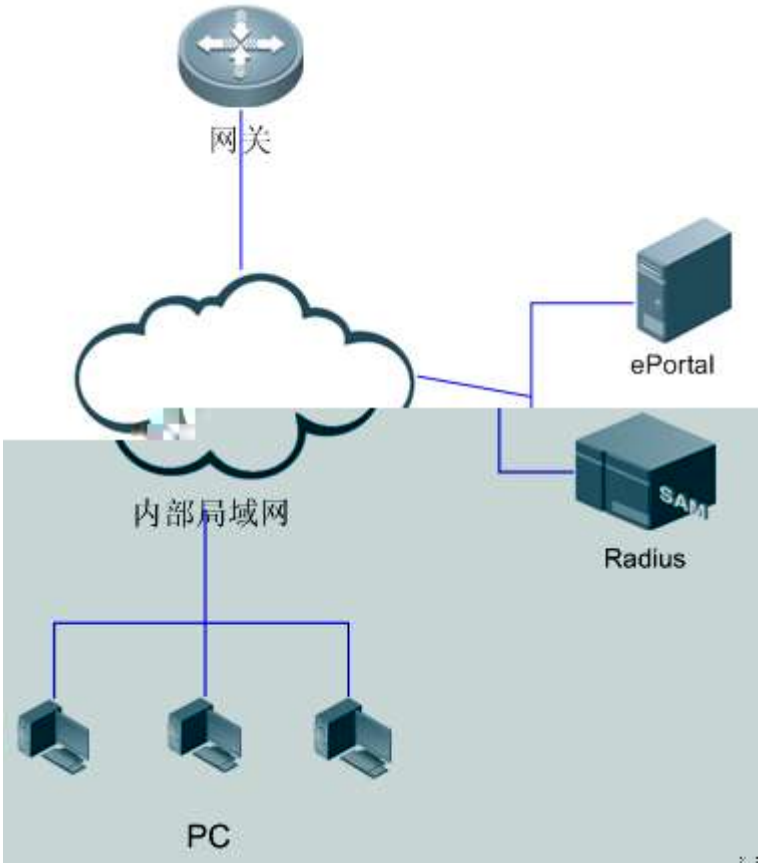
portal
radius Radius AAA radius

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **web-auth authentication** *method-list*	AAA
Step 3	Ruijie(config)# **show web-auth local**	Web

(radius)

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **web-auth customized-logo enable**	logo logo
Step 3	Ruijie(config)# **show web-auth global**	Web

15.7.2



6 Web

eportal HTTP

1. A URL
2. HTTP Portal
3. A
4. Portal RADIUS A
5. Portal A A Internet

1. Portal SNMP
2. A Internet

1. A Portal
2. Portal

Internet

Portal

1. Portal A P

192.168.5.1

http redirect

IP 192.168.4.12

A internet Web internet

15.7.5

HTTP

Web

1. VRRP

2. MULTI-LDP

3 RNS&Track

1 VRRP

1.1

VRRP (Virtual Router Redundancy Protocol)

VRRP VRRP

VRRP

RFC 2338 VRRP IP VRRP

VRRP IP

IP

VRRP

VRRP

RFC 2338

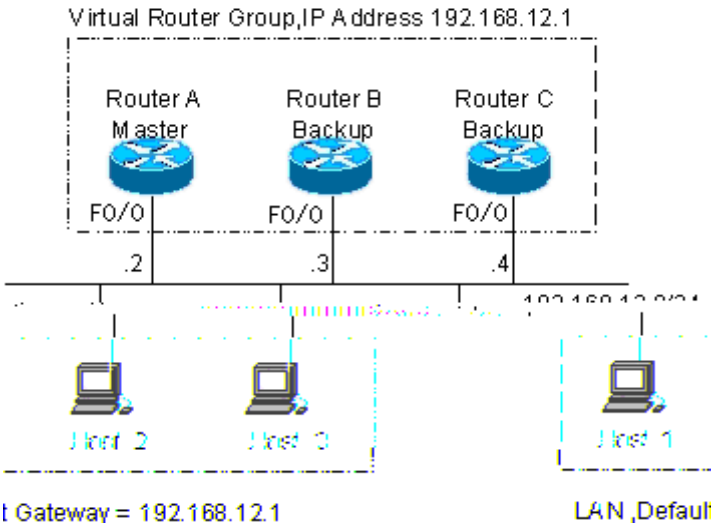
192.168.12.0/24 R1 R2 Fa0/0 VRRP
VRRP IP
VRRP VRRP
PC 1 PC 2 PC 1
PC 2 VRRP
PC 2 PC 1
R1 R2 VRRP R1 R2

1.2 VRRP

VRRP

1.2.1

VRRP

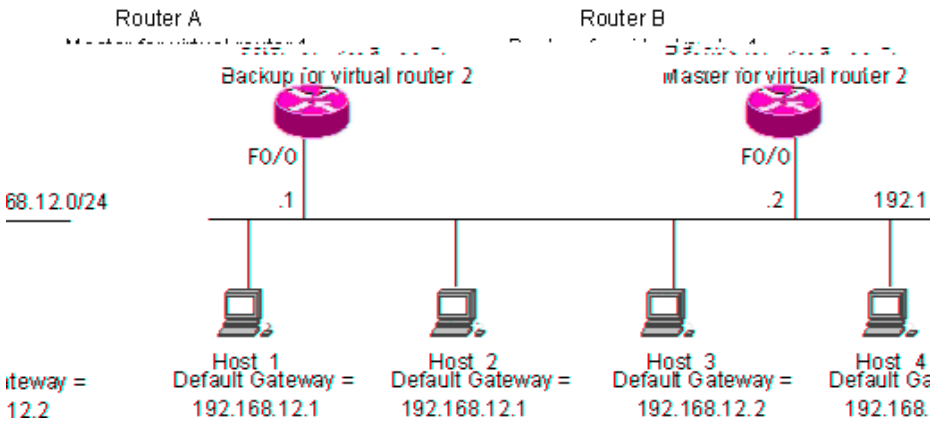


VRRP

A B C
VRRP VRRP VRRP IP 192.168.12.1
A VRRP B C
1 2 3 IP 192.168.12.1
(A) A B
C

1.2.2

VRRP



VRRP

1 A Fa0/0 IP 192.168.12.1 IP A B 2 B Fa0/0 IP 192.168.12.2 IP B A 1 2 1 IP 192.168.12.1 3 4 2 IP 192.168.12.2 VRRP A B

1.3 VRRP

1.3.1 VRRP

VRRP VRRP

VRRP ( )

VRRP ( )

VRRP ( )

VRRP ( )

VRRP ( )

VRRP ( )

VRRP IP ( )

VRRP ( )

VRRP ( )

VRRP ( )

VRRP

1.3.2 VRRP

IP

VRRP

Ruijie(config-if)# **vrrp** *group* **ip** *ipaddress* [**secondary**]	VRRP
Ruijie(config-if)# **no vrrp** *group* **ip** *ipaddress* [**secondary**]	VRRP

VRRP

1.3.7 VRRP

VRRP

VRRP

VRRP ( )

Ruijie(config-if)# **vrrp** *group* **track** *interface-type number* [*interface priority*]	VRRP
Ruijie(config-if)# **no vrrp** *group* **track** *interface-type number*	VRRP

VRRP Interface -Priority
1~255 Interface -Priority 10

(Routed Port SVI Loopback Tunnel
)

1.3.8 VRRP IP

VRRP IP
IP ping
VRRP
VRRP ( ) interval
timeout retry

[redacted]	

1.3.9 VRRP

VRRP

VRRP VRRP Master

VRRP

VRRP

VRRP

VRRP
VRRP

1.4.2 debug vrrp

debug vrrp VRRP

Ruijie# **debug vrrp errors**	VRRP
Ruijie# **no debug vrrp errors**	VRRP
Ruijie# **debug vrrp events**	VRRP
Ruijie# **no debug vrrp events**	VRRP
Ruijie# **debug vrrp packets**	VRRP
Ruijie# **no debug vrrp packets**	VRRP
Ruijie# **debug vrrp state**	VRRP
Ruijie# **no debug vrrp state**	VRRP
Ruijie# **debug vrrp**	VRRP
Ruijie# **no debug vrrp**	VRRP

1. **debug vrrp**

2. **debug vrrp errors**

192.168.201.213 VRRP 1 VRRP
IP 192.168.1.1 VRRP 1

3. **debug vrrp events**

VRRP VRRP (Advertisement)

4. **debug vrrp packets**

VRRP 2 VRRP VRRP 0XDD4D

192.168.201.213 VRRP 1 VRRP
120

5. **debug vrrp state**

GigabitEthernet 0/0 VRRP Master Backup Init

1.5 VRRP

R1 R2 VRRP 192.168.201.0
/24 VRRP R3 VRRP
R1 R2 VRRP

R1

R1 VRRP

R1 R2 VRRP 1 VRRP (
) IP (192.168.201.1) VRRP R2
R2 VRRP (Advertisement) 3 R1
VRRP 120 R2 VRRP 100
R1 Master R1 Master
GigabitEthernet 2/1 R1 VRRP 30
90 R2 Master R1
GigabitEthernet 2/1 VRRP 30
120 R1

1.5.3 VRRP

R2 R2 VRRP 1 2

1.6 VRRP

VRRP

IP Ping

Ping IP : VRRP
show vrrp VRRP

ARP
IP ARP

IP
VRRP Master

VRRP VRRP
VRRP VRRP

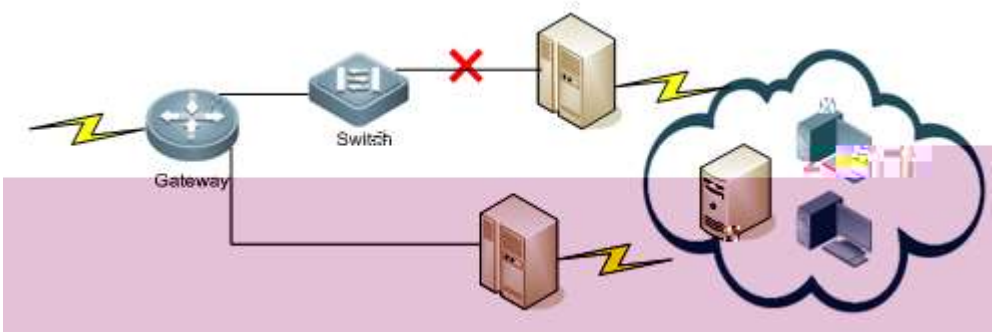
VRRP

VRRP VRRP

VRRP VRRP IP

2 MULTI-LDP

2.1 MULTI-LDP



MULTI-LDP

2.1.1 MULTI-LDP

MULTI-DLP

MULTI-DLP

2.1.2

MULTI-LDP ICMP DNS TCP
ARP ICMP DNS TCP

MULTI-LDP

1 ICMP/DNS/TCP
MULTI-LDP ARP ARP
DOWN ARP
ICMP/DNS/TCP

2 UP ICMP
ICMP DNS
DOWN

3 MULTI-LDP

2.1.3

RFC792 INTERNET CONTROL MESSAGE PROTOCOL

RFC1034 DOMAIN NAMES - CONCEPTS AND FACILITIES

RFC1035 DOMAIN NAMES - IMPLEMENTATION AND SPECIFICATION

2.2

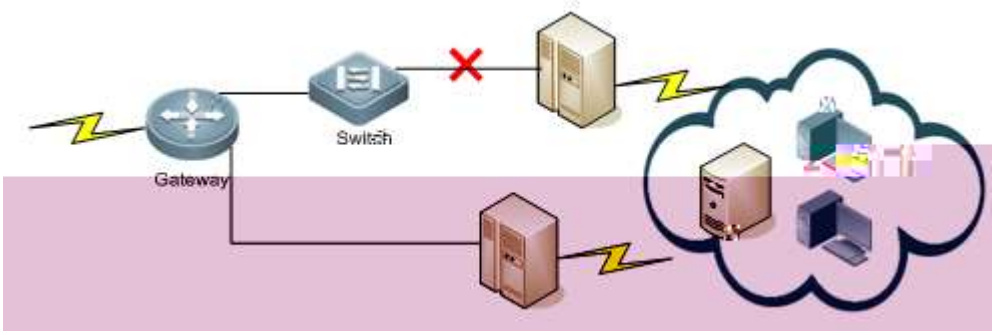
MULTI-LDP

MULTI-LDP

2.3.2 MULTI-LDP

Step 1	Ruijie> **enable**	
Step 2	Ruijie# **configure terminal**	
Step 3	Ruijie(config) **#interface** *interface-type number*	
Step 4	Ruijie(config-if)# **no multi-ldp**	multi

2.4.2



2.4.3

1 ICMP IP IP next-hop

2 retry resume

2.4.4

interface gigabitEthernet 0/1 icmp 192.168.20.1 dns 192.168.5.110 tcp 192.168.6.66 10tick 3 UP DOWN 2 DOWN UP

Ruijie#**config**

Ruijie(config)#interface gigabitEthernet 0/1

Ruijie(config-if-GigabitEthernet 0/1)#**multi-ldp icmp** 192.168.20.1 **dns** 192.168.5.110 **tcp** 192.168.6.66 **interval** 10 **retry** 3 **resume** 2

Ruijie(config-if-GigabitEthernet 0/1)#**end**

2.4.5

Ruijie#show multi-ldp interface

Interface State Retry UpCnt ICMP Next-hop

StartTime Interval Resume DownCnt DNS TCP

==========
========

GigabitEthernet 0/1 DOWN 5 0 192.168.201.1 192.168.201.160

2010-12-23 09:31:03 50 1 0 N/A
192.168.201.160:80

GigabitEthernet 0/3 UP 5 1 192.168.198.1 192.168.78.1

2010-12-23 09:31:03 50 1 0 8.8.8.8 220.181.112.76:80

rns dns

rns dns

Ruijie# **configure terminal**	
Ruijie(config)# **ip rns** *operation-number*	ip rns
Ruijie(config-ip-rns)# **dns** *word* **name-server** *a.b.c.d* [**source-ipaddr** *ip-address*] [**out-interface** *type number* [**next-hop** *nhop-ip*]]	ip rns dns
Ruijie(config-ip-rns-dns)# **frequency** *millliseconds*	
Ruijie(config-ip-rns-dns)# **timeout** *millliseconds*	

rns

rns

track

track

rns

track rns rns track up track down

track rns , track up

4) IP RNS

5) track

6) route-map track

7)

Ruijie(config)# **track** *object-number* **rns** *entry-number*	ip rns track
Ruijie(config-track)# **delay** { **up** *seconds* [**down** *seconds*] | [**up** *seconds*] **down** *seconds* }	track
Ruijie(config-track)# **exit**	

track

track

track track down

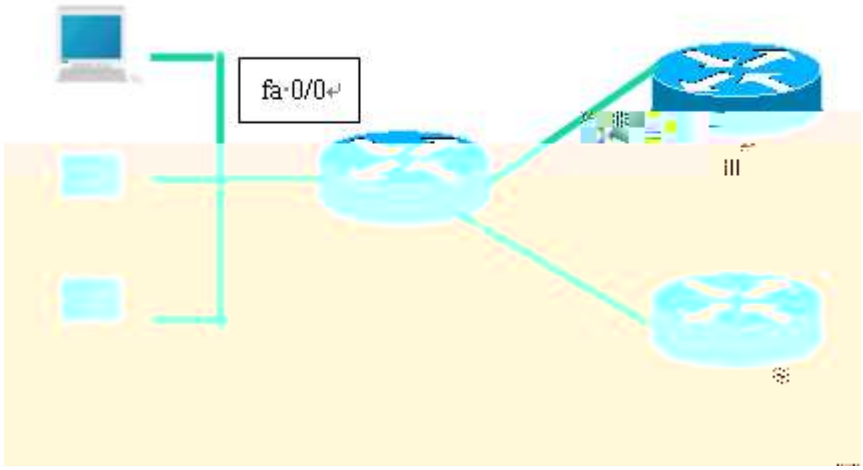
8) IP RNS

9) track

10) route-map track

11)

Ruijie(config)# **interface** *type number* Ruijie(config-if)# **ip address** *ip-address mask* [*secondary*	



Router1

IP RNS , IP .

```

```

track

```

```

#

```

```

#10.1.1.1

```

```

#10.2.2.2

```

```

route-map, , .

```

```

1.

2.

3.

4.

5. USB

6. SATA

1

EG syslog

1.1

1.1.1

CPU

1.1.2

CPU

90

1.2

1.3.1

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **dev-audit enable**	
Step 3	Ruijie(config)#**end**	
Step 4	Ruijie#**show running**	

no dev-audit enable

#

1.4

Ruijie(config-if)# **show dev-audit** { **cpu** | **memory** | **flash** } [**from** *year* [*month* [*day* [*hh:mm:ss* [**to** *year* [*month* [*day* [*hh:mm:ss*]]]]]]]]	show CPU

2

2.1

2.1.1

CPU

CPU

2.1.2 CPU

show cpu CPU CPU

Ruijie# **show cpu**	CPU

Ruijie

show cpu

3 5 1 5 CPU
LISR HISR CPU

No
5Sec 5 CPU
1Min 1 CPU
5Min 5 CPU
Process
2 LISR CPU HISR CPU 3
CPU idle CPU

2.1.3 CPU

CPU , cpu-log CPU

cpu-log log-limit *low_num high_num*	CPU

100% 90%

CPU 70% 80%

CPU

CPU 80% 80% , ,

CPU 70% 70% , ,,

3

3.1

3.1.1

Threshold CPU

CLI MIB

3.1.2

3.1.2.1 CPU

CPU CPU MIB log

3.1.2.2

MIB log

3.1.2.3

normal condition
warning condition
alert condition

log log

log

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

3.3.3

Step 1	Ruijie# **configure terminal**	
Step 2	Ruijie(config)# **threshold set temperature [M1 | M2 | slot** *n* **| member** *n***]** *warning_value critical_value*	0 ~ 2147483647

no threshold set temperature

3.3.4

show threshold cpu	CPU
show threshold memory	
show threshold temperature	

3.4

3.4.1

CPU 80 90 50 80

3.4.2

show threshold

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

CPU

4

4.1

4.1.1

4.1.2

show memory

Ruijie# **show memory**	

Ruijie

show memory

1. 4k
2.

min	
lower	**memory-lack exit-policy**

low	
high	

3.

4.1.3

memory-lack exit-policy lower
BGP OSPF RIP PIM-SM

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

Ruijie(c4] TJE) 0 0 1 109.16 487.96 T

BGP OSPF

RIP LDP PIM ISIS

RGOS USB USB-HDD

~

U

5.2.4 USB

USB CLI

6 SATA

6.1 SATA

6.1.1 SATA

SATA SATA FAT32

SATA

6.1.2

SATA dir copy del

SATA SATA flash

Ruijie# cd /mnt/sata/c # SATA

Ruijie# copy flash: a.txt flash: /b.txt # SATA a.txt

dir / flash b.txt

SATA

6.1.3 SATA

Ruijie# **show sata**	SATA

CLI **show sata** SATA

SATA

Disk Partitions
c

6.1.4

makefs SATA

Ruijie# **makefs dev** *dev_file* **fs** *fs_name*	*dev_file* *fs_name*

SATA

SATA c fat32

6.2 SATA

Ruijie(config-if)# **show sata**	show sata SATA

1.

2. RLOG

3. SNMP

4. MIB

5.

6. APM

1

1.1

UP DOWN

VTY

FLASH

FLASH FLASH FLASH

Ruijie(config)# **logging count**	

1.2.6

Ruijie(config)# **no service sequence-numbers**	
Ruijie(config)# **service sequence-numbers**	

1.2.7

Ruijie(config-line)# **logging synchronous**	
Ruijie(config)# **no logging synchronous**	

1.2.8

Ruijie(config)# **logging rate-limit** *number*	
Ruijie(config)# **no logging rate-limit**	

1.2.9

Ruijie(config)# **logging console** *level*	
Ruijie(config)# **logging monitor** *level*	VTY (telnet)
Ruijie(config)# **logging buffered** [*buffer-size* | *level*]	
Ruijie(config)# **logging file flash:***filename* [*max-file-size*] [*level*]	FLASH
Ruijie(config)# **logging trap** *level*	Syslog Server

8

Emergencies	0	
Alerts	1	
Critical	2	
Errors	3	
warnings	4	

Notifications

Ruijie(config)# **logging source interface** *interface-type interface-number*	
Ruijie(config)# **logging source ip** *A.B.C.D*	ip

1.2.12 LOG

LOG

/ LOG LOG

Ruijie(config)# **logging userinfo**	/ LOG
Ruijie(config)# **logging userinfo command-log**	LOG

1.3

Ruijie# **show logging**	
Ruijie# **show logging count**	
Ruijie# **clear logging**	
Ruijie# **more flash:***filename*	FLASH

show logging count

1.3.1

//

// debug

// log

// syslog server
// syslog
server

2 RLOG

2.1

rlog

rlog nat

web

/NAT

2.2

2.2.1

udp

Ruijie(config)# **rlog server** [**vrf** *vrf-name* | **oob**] [**port** *port-num*]	ip VRF 20000
Ruijie(config)# **no rlog server** *server-ip*	

ip session log-on

2.2.2

telnet 28
web 29
web bbs 30
im 31
FTP 32
Web 33
0-7
XLOG_PRIORITY_EMER,
XLOG_PRIORITY_ALERT,
XLOG_PRIORITY_ERR,
XLOG_PRIORITY_WARN,
XLOG_PRIORITY_NOTICE,
XLOG_PRIORIT

2.3

Ruijie# **show rlog-type**	
Ruijie# **show rlog-status server** *server-ip* Ruijie# **Show nat-log [username** *user_name*	

2.5

web

3 SNMP

3.1 SNMP

3.1.1

SNMP Simple Network Manger Protocol 1988 8
RFC1157 SNMP
SNMP
SNMP

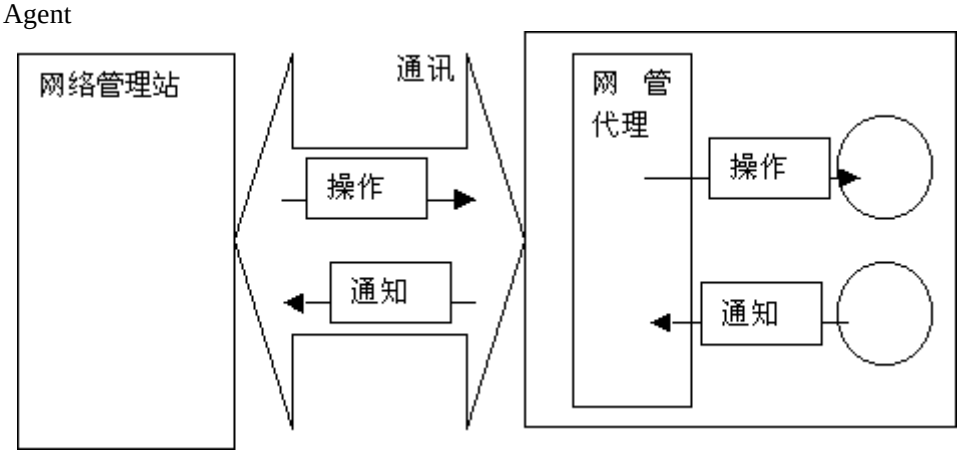
SNMP /

SNMP
SNMP
MIB

SNMP SNMP NMS (Network Management System) NMS HP OpenView CiscoView CiscoWorks 2000 Star View

SNMP SNMP Agent NMS
NMS

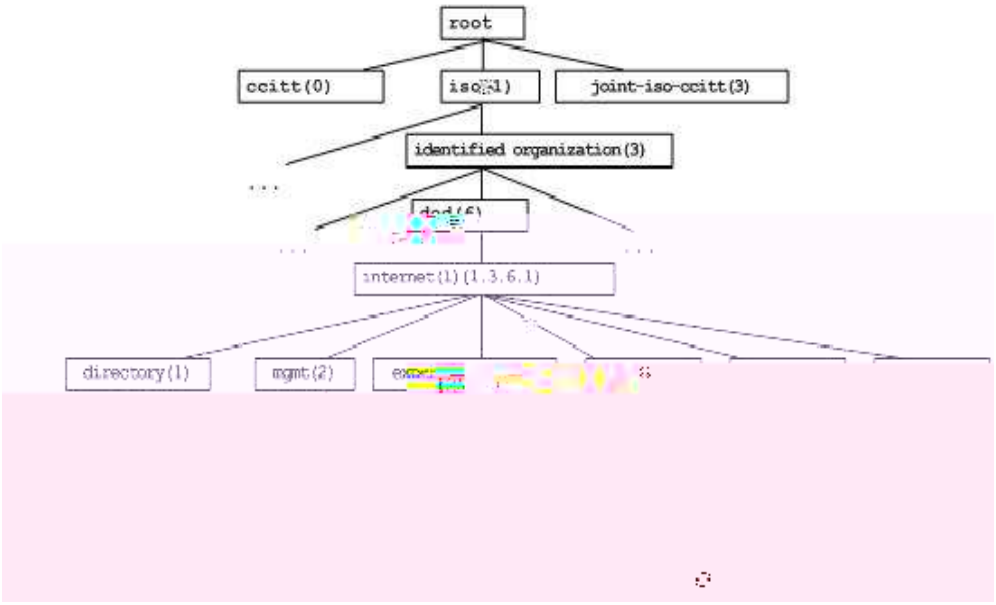
NMS Agent



NMS Agent

MIB Management Information Base
SNMP MIB
MIB
System

{1.3.6.1.2.1.1} Object Identifier MIB



MIB

3.1.2 SNMP

SNMP

SNMPv1 RFC1157

SNMPv2C Community-Based SNMPv2 , RFC1901

SNMPv3

1.

2.

3.

SNMPv1 SNMPv2C Community-based
(Commumity String) MIB

SNMPv2C Get-bulk
Get-bulk

- SNMPv2C
SNMPv1

SNMPv1 SNMPv2C SNMP
SNMPv1 SNMPv2C

3.1.3 SNMP

SNMP NMS Agent 6

1. Get-request NMS Agent

3.2.3 SNMP

3.2.6 SNMP

SNMP

Ruijie(config)# **snmp-server packetsize** *byte-count*	

3.2.7 SNMP

SNMP

snmp snmp

Ruijie(config)# **no snmp-server**	SNMP

3.2.8 SNMP

snmp snmp

SNMP

Ruijie(config)# **no enable service snmp-agent**	SNMP

3.2.9 Agent NMS Trap

Trap Agent NMS

Agent Trap

Ruijie(config)# **snmp-server enable traps** [*type*] [*option*]	Agent Trap
Ruijie(config)# **no snmp-server enable traps** [*type*] [*option*]	Agent Trap

3.2.10 Link Trap

LinkTrap Link

SNMP LinkTrap,

Ruijie(config)# **interface** *interface-id*	
Ruijie(config-if)# [**no**] **snmp trap link-status**	link trap .

Link trap:

3.3 SNMP

3.3.1 SNMP

SNMP SNMP SNMP
SNMP **show snmp**
SNMP

Too big errors (Maximum packet size 1500)	
No such name errors	
Bad values errors	
General errors	
Get-response PDUs	Get-response
SNMP trap PDUs	SNMP trap

3.3.2 SNMP MIB

show snmp mib MIB

3.3.3 SNMP

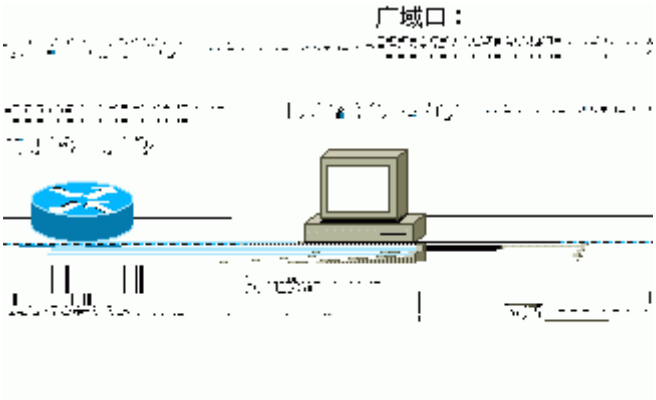
show snmp user

show snmp view

3.4 SNMP

3.4.1

NMS NMS IP 192.168.12.181
IP 192.168.12.1 HP OpenView



SNMP

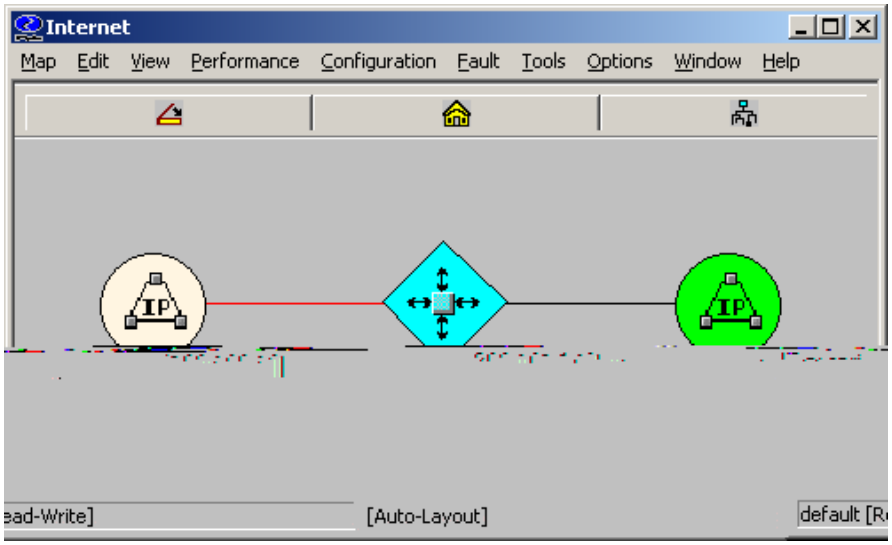
SNMP

SNMP NMS
SNMP

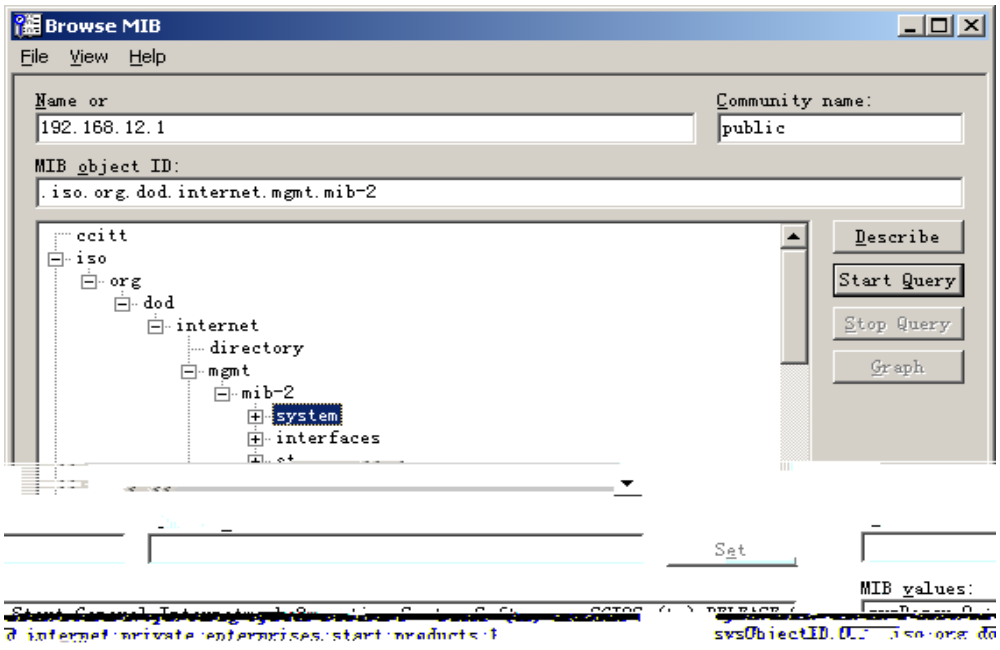
SNMP NMS

NMS Trap

SNMP NMS
HP OpenView



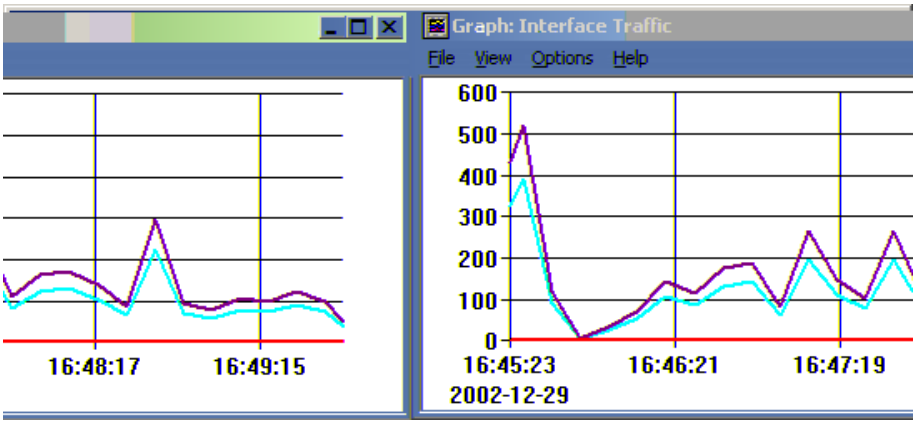
HP OpenView TOOL->SNMP MIB
Brower Name IP 192.168.12.1 Community Name
Public MIB System Start Query
MIB MIB Values



MIB

HP OpenView

SNMP



3.4.2 SNMP

NMS SNMP

4 MIB

MIB

MIB

MIB

4.1 MIB

MIB

BRIDGE-MIB (RFC1493)

EtherLike-MIB(RFC1643)

IF-MIB(RFC2863)

RFC1213-MIB

RMON1-MIB RMON etherStats, etherHistory,alarms, events

SNMPv2-MIB

SNMPv3-MIB USM VACM

MIB

RUIJIE-AAA-MIB

RUIJIE -ENTITY-MIB

RUIJIE -RIP-MIB

RUIJIE -MEMORY-MIB

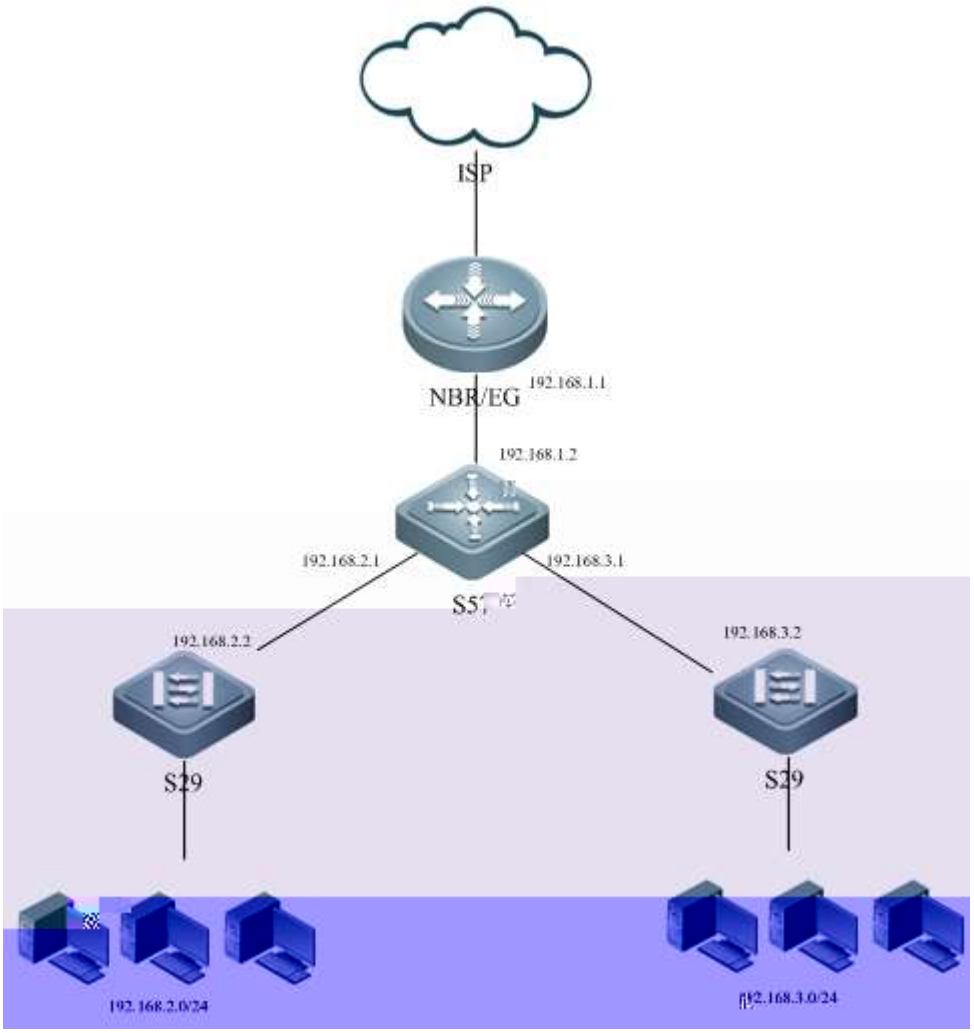
MIB

show snmp mib MIB

5

5.1

5.1.1



EG

anti-arp-spoof ip *ip-address* arp

ip-addr IP

arp

EG WEB

ARP

ARP

5.1.2 /

5.1.2.1 ARP

ARP (**anti-arp-spoof ip** *ip-address*) IP

ip-address ARP IP PC IP PC

IP IP ARP

ARP

	ARP PC arp (PC) PC

5.1.3

EG HTTP EG HTTP POST

web server EG IP web

EG ARP

5.1.4

5.2

5.3

/

5.3.1

EG

Step 1	Ruijie(config)# **co-oper entity** { **branch** | **center** } *ip-address* {**0|7**} *line*	IP branch center web/enable
Step 2	Ruijie# **show co-operv2 entity**	

EG

( ) PC

1 EG 2

2 2

PC

EG

1 IP

2 ip http authentication enable HTTP enable enable

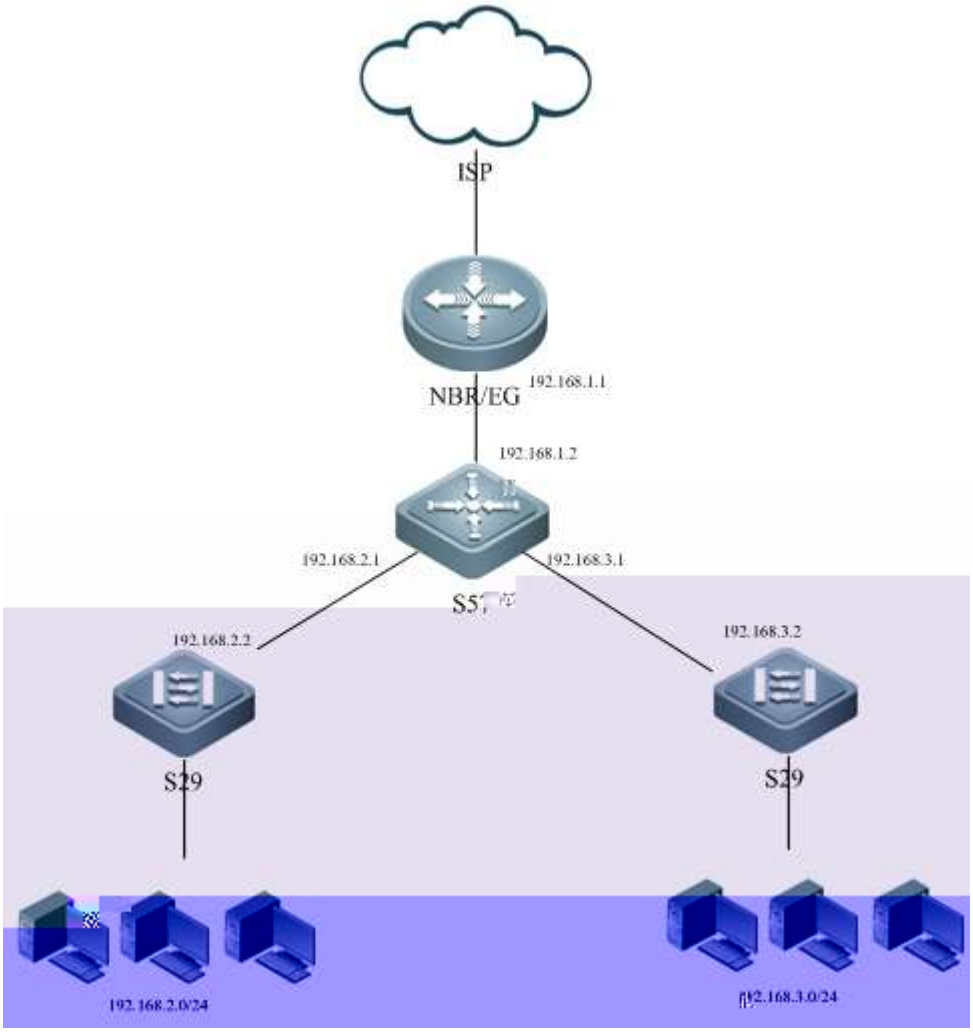
3 enable secret

4 web enable service web-server

5.3.2 /

Ruijie#**co-oper {enable|disable}**	/

5.4.1.2



5.4.1.3

EG IP web

5.4.1.4

1 (ip web S5750)

ip

Ruijie(config)# interface vlan 1

Ruijie(config-if)# ip address 192.168.1.2 255.255.255.0

Ruijie(config)# interface vlan 2

Ruijie(config-if)# ip address 192.168.2.1 255.255.255.0

Ruijie(config)# interface vlan 3

Ruijie(config-if)# ip address 192.168.3.1 255.255.255.0

web web

Ruijie(config)# enable service web-server

Ruijie(Config)#ip http authentication enable

Ruijie(config)# enable secret 0 admin

S2924G S5750 ip

2 EG

3