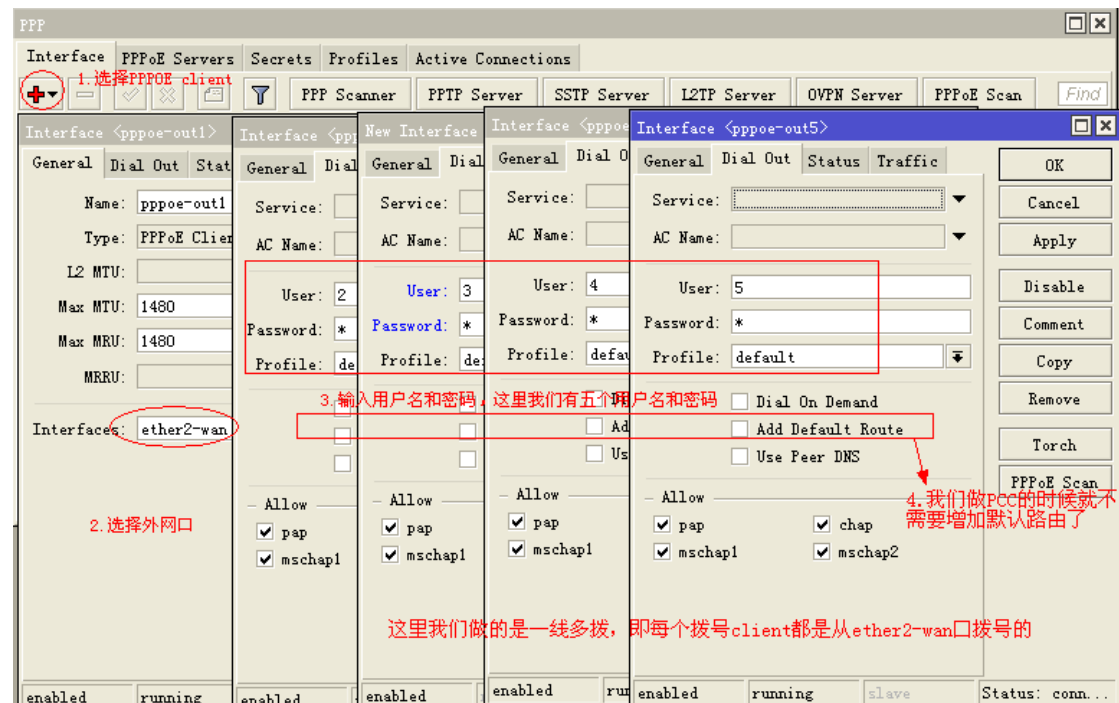


PCC 实验

一、基本配置，使网络能够正常连通

1.pppoe 拨号：

拨通五个帐号



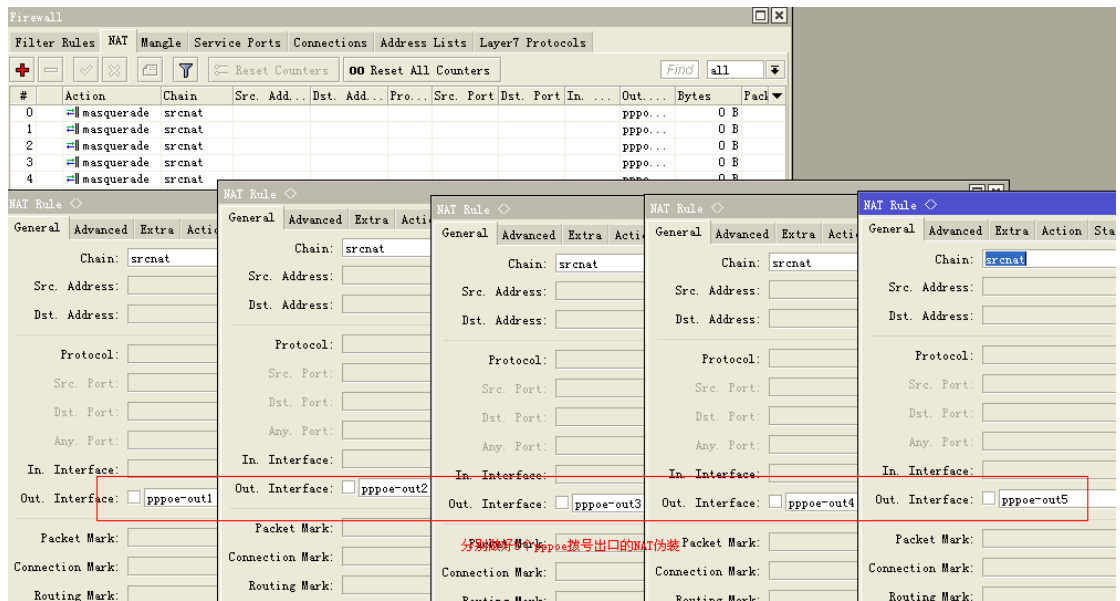
PPPOE client 的连接状态，已连接

PPP											
Interface PPPoE Servers Secrets Profiles Active Connections											
PPP Scanner PPTP Server SSTP Server L2TP Server OVPN Server PPPoE Scan											
Name	Type	L2 MTU	Tx	Rx	Tx P...	Rx P...	Tx D...	Rx D...	Tx E...	Rx E...	
R	pppoe-out1	PPPoE Client	0 bps	0 bps	0	0	0	0	0	0	
R	pppoe-out2	PPPoE Client	0 bps	0 bps	0	0	0	0	0	0	
R	pppoe-out3	PPPoE Client	0 bps	0 bps	0	0	0	0	0	0	
R	pppoe-out4	PPPoE Client	0 bps	0 bps	0	0	0	0	0	0	
R	pppoe-out5	PPPoE Client	0 bps	0 bps	0	0	0	0	0	0	

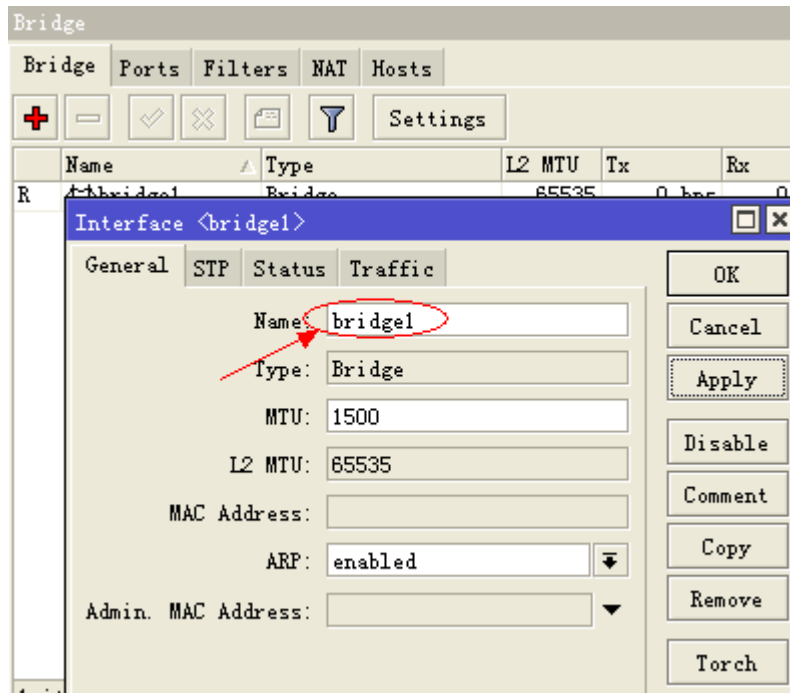
R, 代表running, 即运行, 表示拨号已连接

设备 NAT:

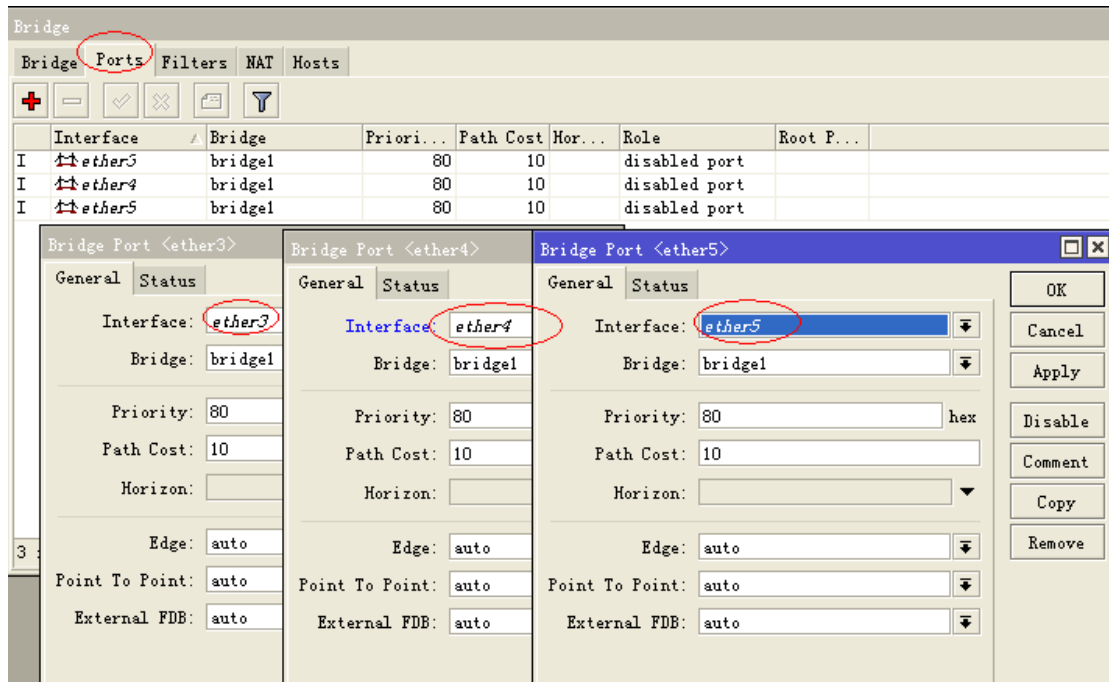
5 个接口出去都做 NAT



创建一个 bridge，把其他局域网口添加到 bridge 中。



添加其他局域网口到 bridge 中

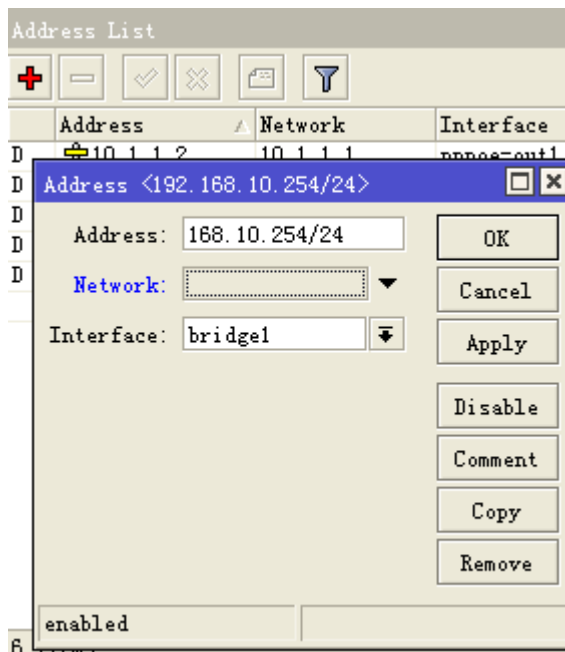


DHCP 服务器设置（局域网自动获取 IP 地址）

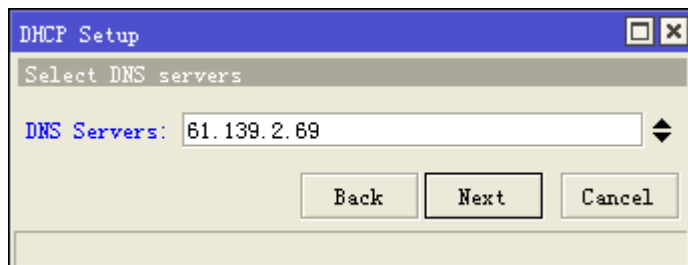
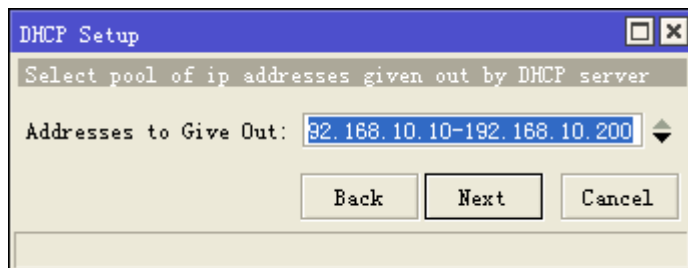
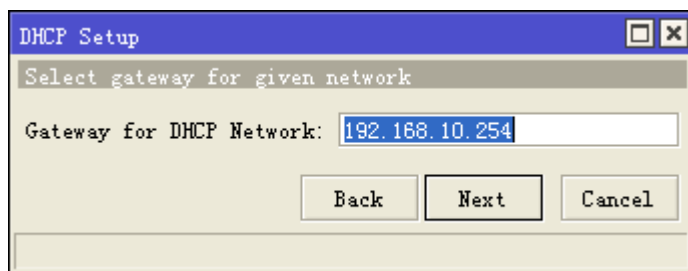
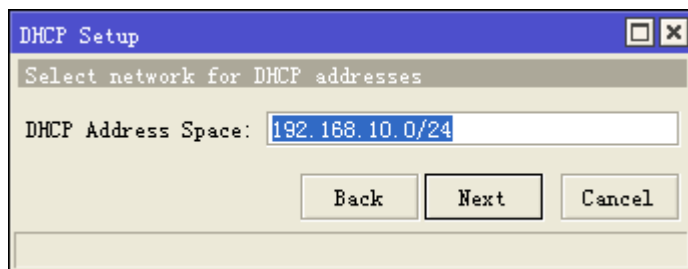
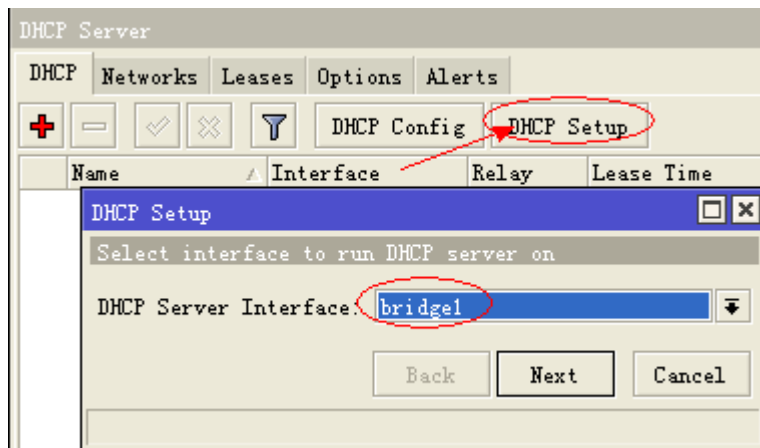
局域网的网段为 192.168.10.0/24

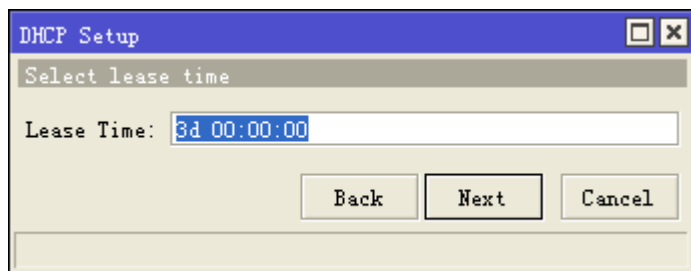
把 192.168.10.254 作为内网的网关

设置网关的地址，接口添加到 bridge1 上

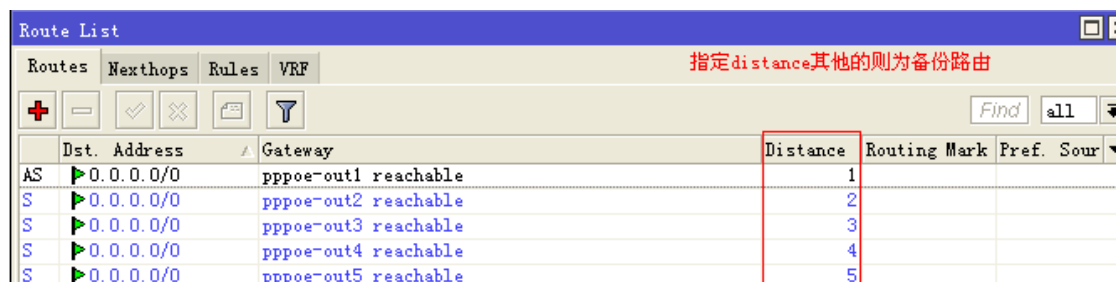


一般我们用 DHCP setup 来自动设置 DHCP server 这种设置比较简单快速





路由配置:



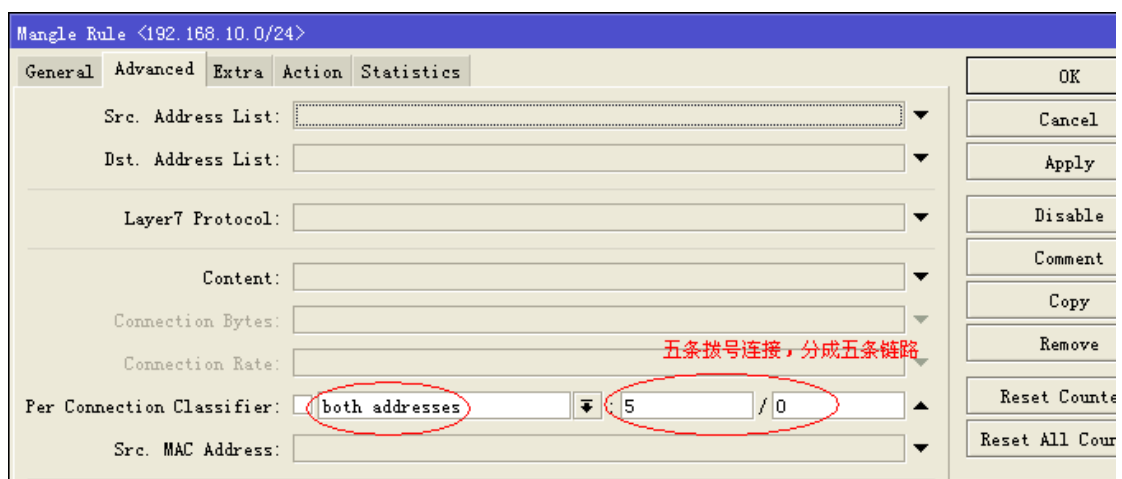
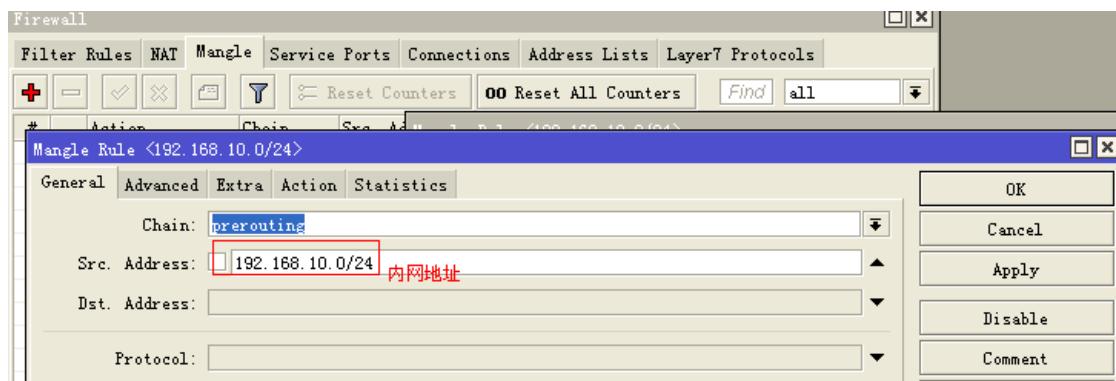
所有的基本配置都设置好了，局域网可以正常上网了，但是为了实现更好的网络环境，我们需要做更好的策略。这就需要使用 PCC 了，下面就看看 PCC 怎么做的吧。

二、PCC 的配置

Mangle 标记

标记内网地址为 192.168.10.0 的五条线路的连接标记

标记第一条连接:



Mangle Rule <192.168.10.0/24>

General Advanced Extra Action Statistics

Connection Limit

Limit

Dst. Limit

Nth

Time

Src. Address Type

Dst. Address Type

Address Type: local

☒ Invert

PSD

Hotspot

IP Fragment

意思是目的地址非本地

Mangle Rule <192.168.10.0/24>

General Advanced Extra Action Statistics

Action: mark connection

New Connection Mark: c1

☒ Passthrough

命名第一条连接为c1

OK

Cancel

Apply

Disabl

Common

同理:

配置剩余的 4 调链路:

5/1,c2; 5/2,c3; 5/3,c4; 5/4,c5.

从连接中提取路由标记:

从连接里提取路由标记

标记第一条连接 c1, 命令为 R1

Mangle Rule <192.168.10.0/24>

General Advanced Extra Action Statistics

Chain: prerouting

Src. Address: 192.168.10.0/24

Dst. Address:

Protocol:

Src. Port:

Dst. Port:

Any. Port:

P2P:

In. Interface:

Out. Interface:

Packet Mark:

Connection Mark: c1

OK

Cancel

Apply

Disable

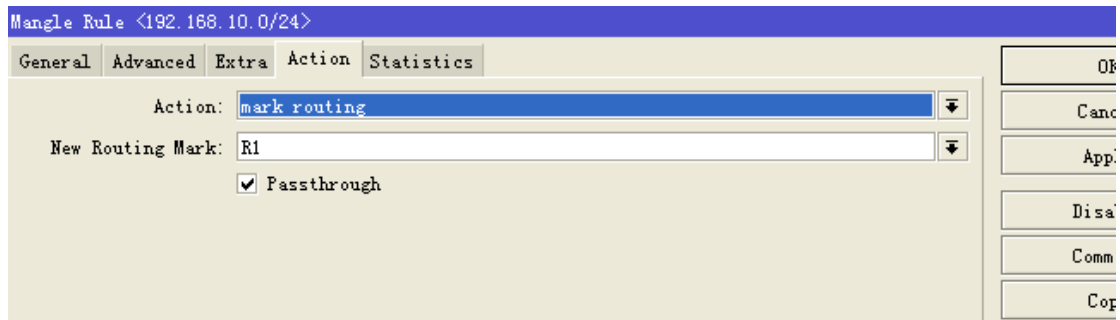
Comment

Copy

Remove

Reset Counter

Reset All Count



同理：

提出其他 4 调路由命名为 R2, R3, R4, R5.

标记连接，的命名配置方式为：

```
[admin@MikroTik] /ip firewall mangle> print
```

Flags: X - disabled, I - invalid, D - dynamic

- 0 chain=prerouting action=mark-connection new-connection-mark=c1
passthrough=yes src-address=192.168.10.0/24 dst-address-type=!local
per-connection-classifier=both-addresses:5/0
- 1 chain=prerouting action=mark-connection new-connection-mark=c2
passthrough=yes src-address=192.168.10.0/24 dst-address-type=!local
per-connection-classifier=both-addresses:5/1
- 2 chain=prerouting action=mark-connection new-connection-mark=c3
passthrough=yes src-address=192.168.10.0/24 dst-address-type=!local
per-connection-classifier=both-addresses:5/2
- 3 chain=prerouting action=mark-connection new-connection-mark=c4
passthrough=yes src-address=192.168.10.0/24 dst-address-type=!local
per-connection-classifier=both-addresses:5/3
- 4 chain=prerouting action=mark-connection new-connection-mark=c5
passthrough=yes src-address=192.168.10.0/24 dst-address-type=!local
per-connection-classifier=both-addresses:5/4

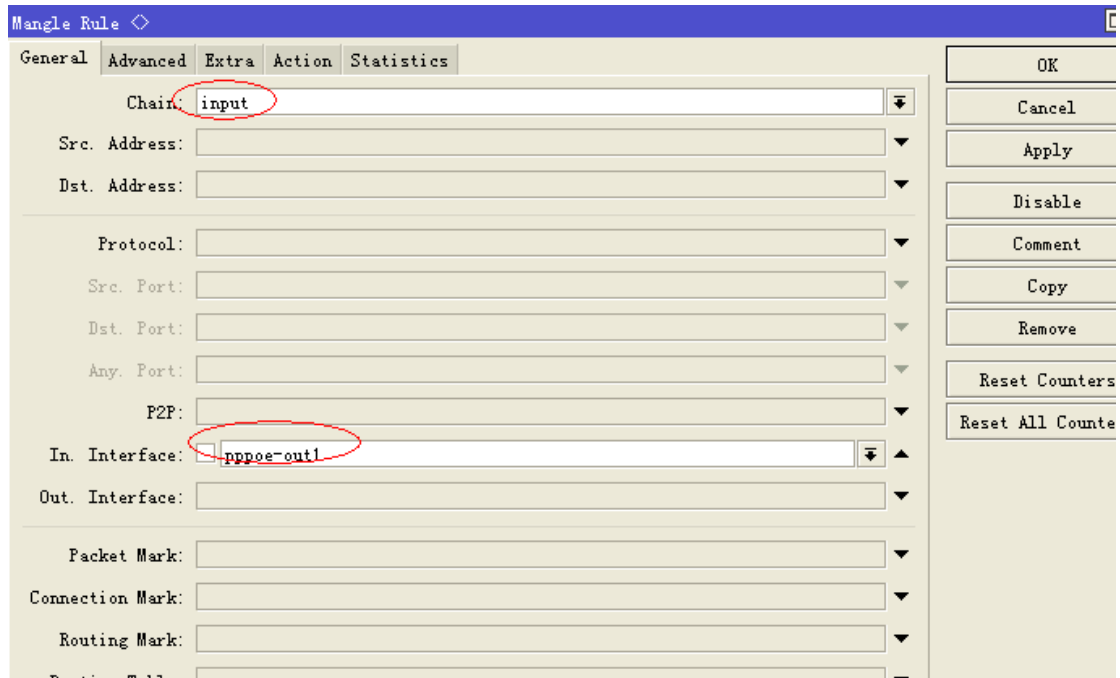
提取路由的命令

- 5 chain=prerouting action=mark-routing new-routing-mark=R1 passthrough=yes
src-address=192.168.10.0/24 connection-mark=c1
- 6 chain=prerouting action=mark-routing new-routing-mark=R2 passthrough=yes
src-address=192.168.10.0/24 connection-mark=c2
- 7 chain=prerouting action=mark-routing new-routing-mark=R3 passthrough=yes
src-address=192.168.10.0/24 connection-mark=c3

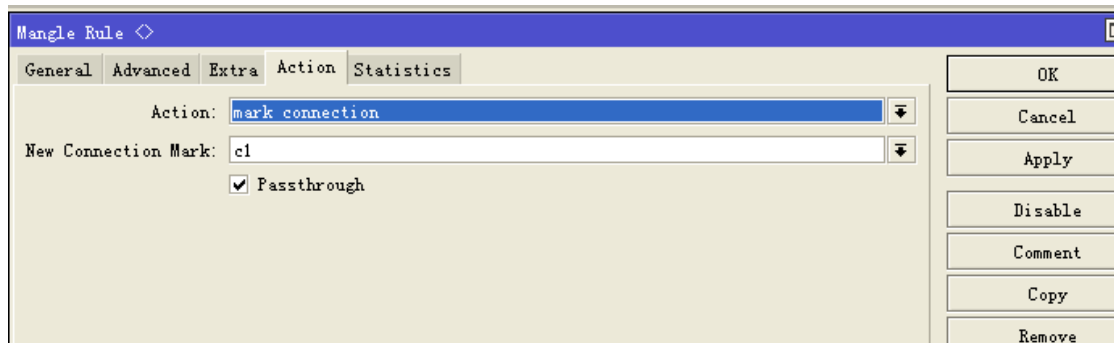
- 8 chain=prerouting action=mark-routing new-routing-mark=R4 passthrough=yes
src-address=192.168.10.0/24 connection-mark=c4
- 9 chain=prerouting action=mark-routing new-routing-mark=R5 passthrough=yes
src-address=192.168.10.0/24 connection-mark=c5

回程路由设置

需要将那个口进入就从相应的口回去，即保证每个外网口的数据能得到正确的路由



The screenshot shows the 'Mangle Rule' configuration window with the 'General' tab selected. The 'Chain' dropdown is set to 'input' and is circled in red. The 'In. Interface' dropdown is set to 'pppoe-out1' and is also circled in red. Other fields like 'Src. Address', 'Dst. Address', 'Protocol', 'Src. Port', 'Dst. Port', 'Any. Port', 'P2P', 'Packet Mark', 'Connection Mark', and 'Routing Mark' are empty. The right sidebar contains buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove, Reset Counters, and Reset All Counters.



The screenshot shows the 'Mangle Rule' configuration window with the 'Action' tab selected. The 'Action' dropdown is set to 'mark connection'. The 'New Connection Mark' dropdown is set to 'c1'. The 'Passthrough' checkbox is checked. The right sidebar contains buttons: OK, Cancel, Apply, Disable, Comment, Copy, and Remove.

同理标记 c2,c3,c4,c5 的回程路由

提取回程路由

Mangle Rule ◇

General Advanced Extra Action Statistics

Chain: output

Src. Address:

Dst. Address:

Protocol:

Src. Port:

Dst. Port:

Any. Port:

P2P:

In. Interface:

Out. Interface:

Packet Mark:

Connection Mark:

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counter

Mangle Rule ◇

General Advanced Extra Action Statistics

Action: mark routing

New Routing Mark: R1

☒ Passthrough

同理提取 c2,c3,c4,c5

命令方式:

- 10 chain=input action=mark-connection new-connection-mark=c1 passthrough=yes
in-interface=pppoe-out1
- 11 chain=input action=mark-connection new-connection-mark=c2 passthrough=yes
in-interface=pppoe-out2
- 12 chain=input action=mark-connection new-connection-mark=c3 passthrough=yes
in-interface=pppoe-out3
- 13 chain=input action=mark-connection new-connection-mark=c4 passthrough=yes
in-interface=pppoe-out4
- 14 chain=input action=mark-connection new-connection-mark=c5 passthrough=yes
in-interface=pppoe-out5
- 15 chain=output action=mark-routing new-routing-mark=R1 passthrough=yes
connection-mark=c1
- 16 chain=output action=mark-routing new-routing-mark=R2 passthrough=yes
connection-mark=c2

- 17 chain=output action=mark-routing new-routing-mark=R3 passthrough=yes
connection-mark=c3
- 18 chain=output action=mark-routing new-routing-mark=R4 passthrough=yes
connection-mark=c4
- 19 chain=output action=mark-routing new-routing-mark=R5 passthrough=yes
connection-mark=c5

路由设置

添加五条默认路由，指定标记的路由

Route List				
Routes				
Next hops Rules VRF				
+ - ✓ ✗ [icon] [icon]				
	Dst. Address	Gateway	Distance	Routing Mark
AS	0.0.0.0/0	pppoe-out1 reachable	1	1R
AS	0.0.0.0/0	pppoe-out2 reachable	1	2R
AS	0.0.0.0/0	pppoe-out3 reachable	1	3R
AS	0.0.0.0/0	pppoe-out4 reachable	1	4R
AS	0.0.0.0/0	pppoe-out5 reachable	1	5R

内网 PC 上开启迅雷下载资料，可以看到所有的拨号出口都有流量

Interface List									
Interface	Ethernet	EoIP Tunnel	IP Tunnel	GRE Tunnel	VLAN	VRRP	Bonding	LTE	
+ − ✓ ✗ 📄 🔍									
Name	Type	L2 MTU	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)			
ether1	Ethernet	1526	0 bps	0 bps	0	0			
R ether2	Ethernet	1522	243.0 kbps	3.2 Mbps	281	314			
ether3	Ethernet	1522	0 bps	0 bps	0	0			
ether4	Ethernet	1522	0 bps	0 bps	0	0			
ether5	Ethernet	1522	0 bps	0 bps	0	0			
R ether6	Ethernet	1522	3.4 Mbps	222.9 kbps	331	290			
ether7	Ethernet	1522	0 bps	0 bps	0	0			
ether8	Ethernet	1522	0 bps	0 bps	0	0			
ether9	Ethernet	1522	0 bps	0 bps	0	0			
R pppoe-out1	PPPoE Client		67.6 kbps	1304.0 kbps	104	127			
R pppoe-out2	PPPoE Client		44.3 kbps	663.4 kbps	57	65			
R pppoe-out3	PPPoE Client		55.9 kbps	1013.8 kbps	86	95			
R pppoe-out4	PPPoE Client		7.8 kbps	2.6 kbps	15	5			
R pppoe-out5	PPPoE Client		8.3 kbps	178.1 kbps	19	16			