

# MUM<sub>2012</sub>

## PCC 负载均衡

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# 负载均衡(Load Balancing)

负载均衡：

负载均衡是建立在现有的网络结构之上，它提供了一种廉价、有效、透明的方法来扩展网络的带宽、增加吞吐量、加强网络数据处理能力、提高网络的灵活性和可用性。

# 负载均衡(Load Balancing)

当使用同一个类型的网络（即同一个运营商的网络）多线路接入时，可以采用负载均衡。

ECMP(Equal-Cost Multi-path):

ECMP是通过在route列表添加多网关的静态路由，然后由路由协议建立动态的多线路由。这种负载均衡有个缺点，缺点就是每十分钟内核会重新均衡线路，使一些连接会被指定到其他路线，出现频繁掉线的情况。

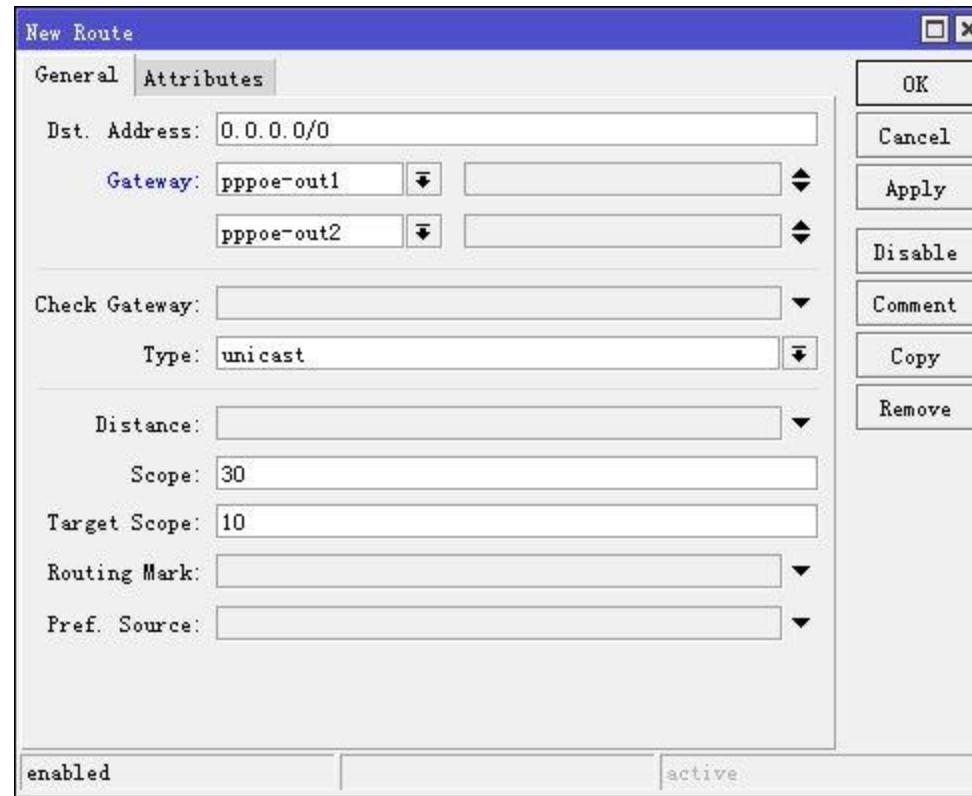
NTH:

NTH是采用第N次链接的负载均衡，它不仅可以实现基于IP的负载均衡，同时还能实现对端口负载均衡和对nat指定有序的访问。这样基本实现了不掉线的真正负载均衡。但是NTH存在着一个弊端，就是在某些对IP要求严格的网站会反复要求验证。比如，网银！这样我们需要通过策略将一些IP或者端口指定走固定的线路出去，从而避开网站繁琐的验证。

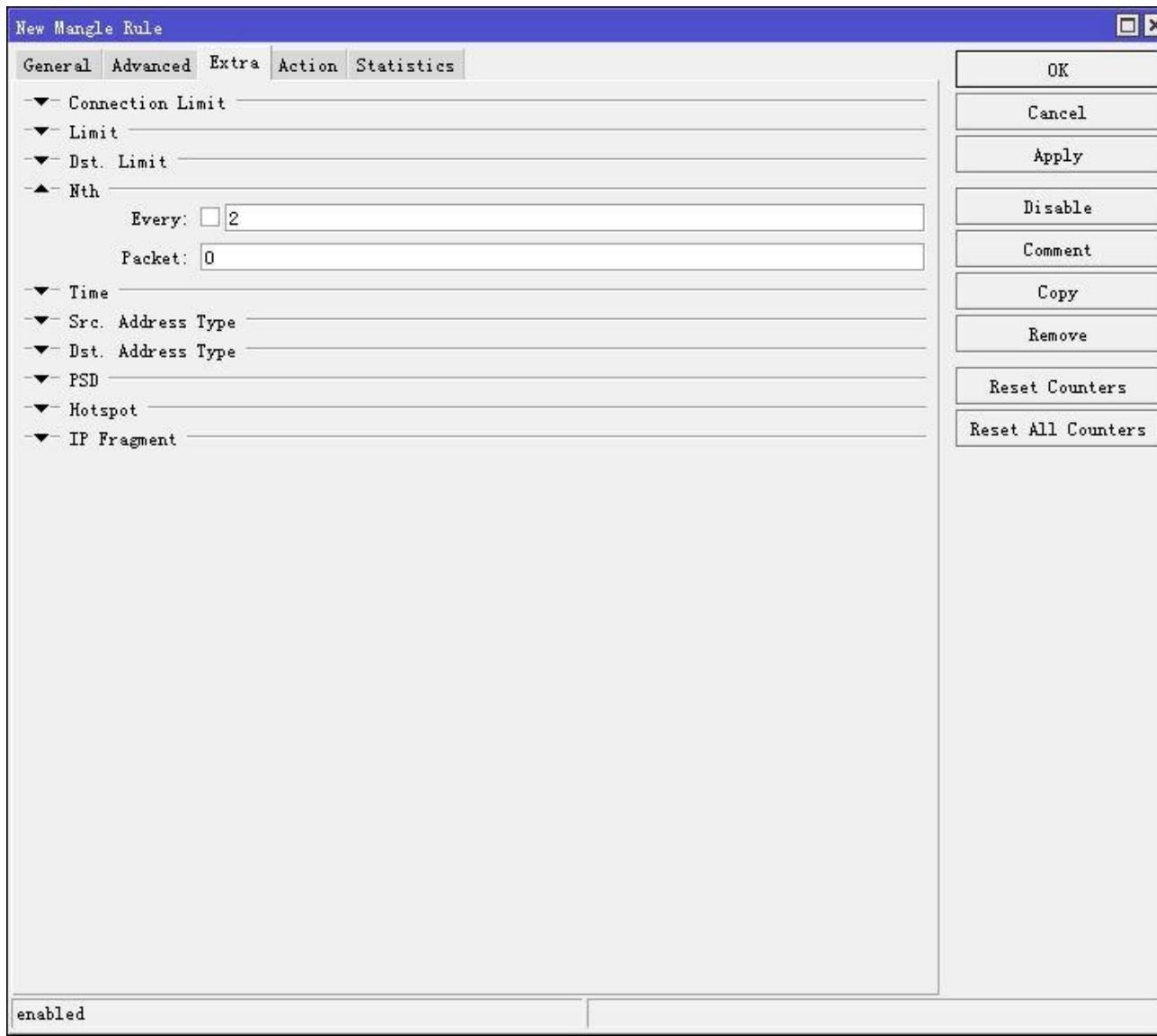
PCC ( Per connection classified ) :

PCC是通过判断源地址或者目的地址、源端口或者目的端口对数据进行分类来实现负载均衡，对每个连接进行分类大多保持了连续性，这样大大弥补了NTH的不足。

# ECMP(Equal-Cost Multi-path)



# NTH



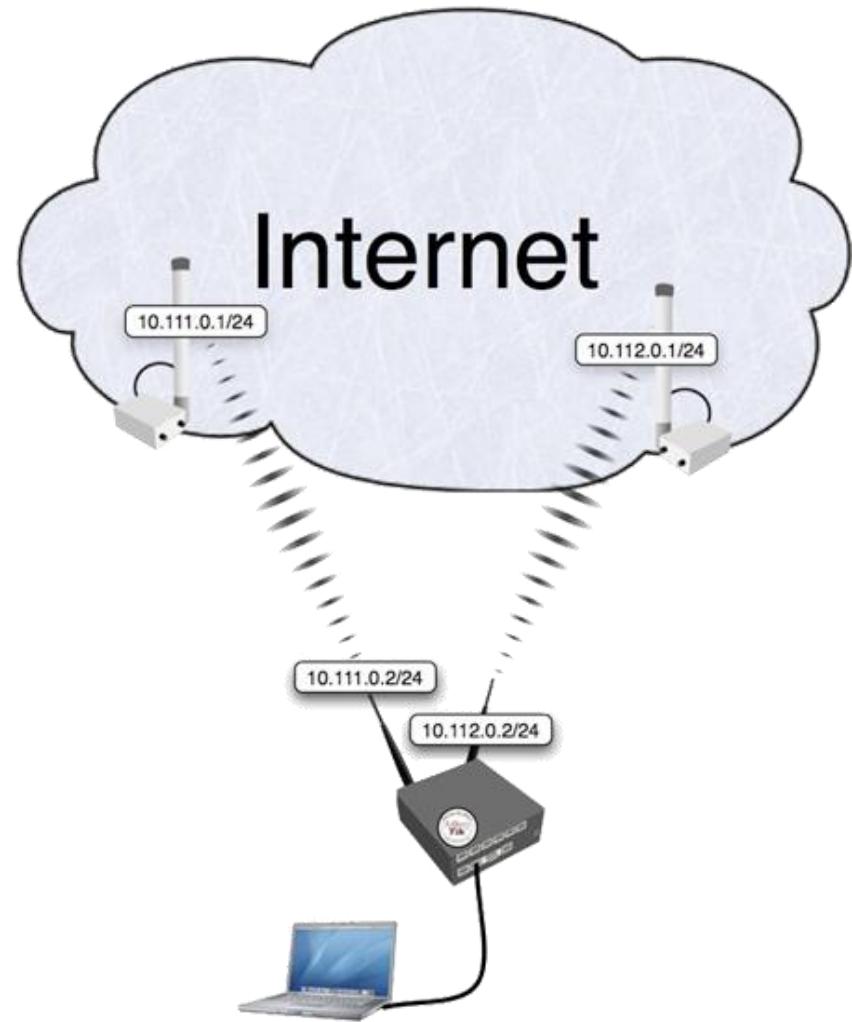
# PCC 负载均衡

- 概述：PCC 允许分离传输流做到平衡流量的功能。（可以根据src-address、src-port、dst-address、dst-port选择）
- 原理：PCC从一定范围内分析选择IP数据包头，通过hash算法将选定的区域转换为32bit值。这个值除了指定分母（Denominator），余数将比较一个指定的余数（Remainder），如果相等这时数据包将会被提取。

# PCC 负载均衡

双向地址负载均衡

通过分组源地址和  
目的地址实现负  
载均衡



# PCC 负载均衡

PCC的常规设置与命令

## pppoe

添加PPPoE拨号。

添加pppoe-client

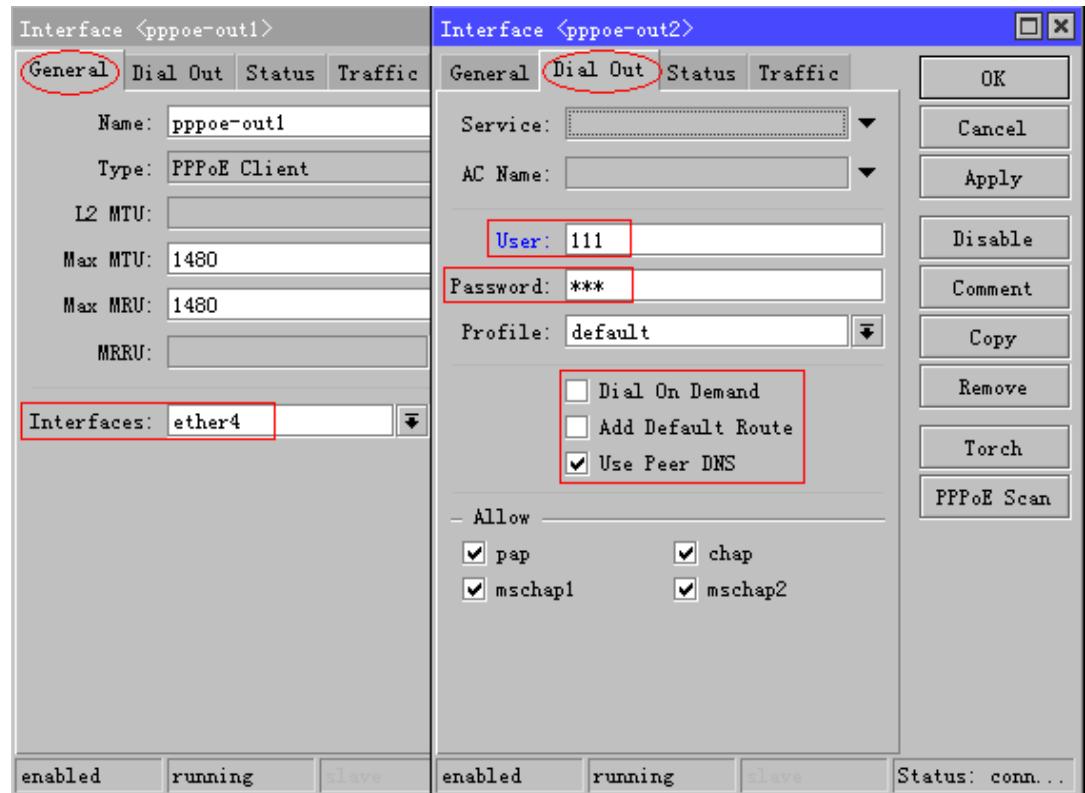
在General下interface选择对应的网口

在Dial Out下填写账号、密码

Dial on demand: 按需拨号

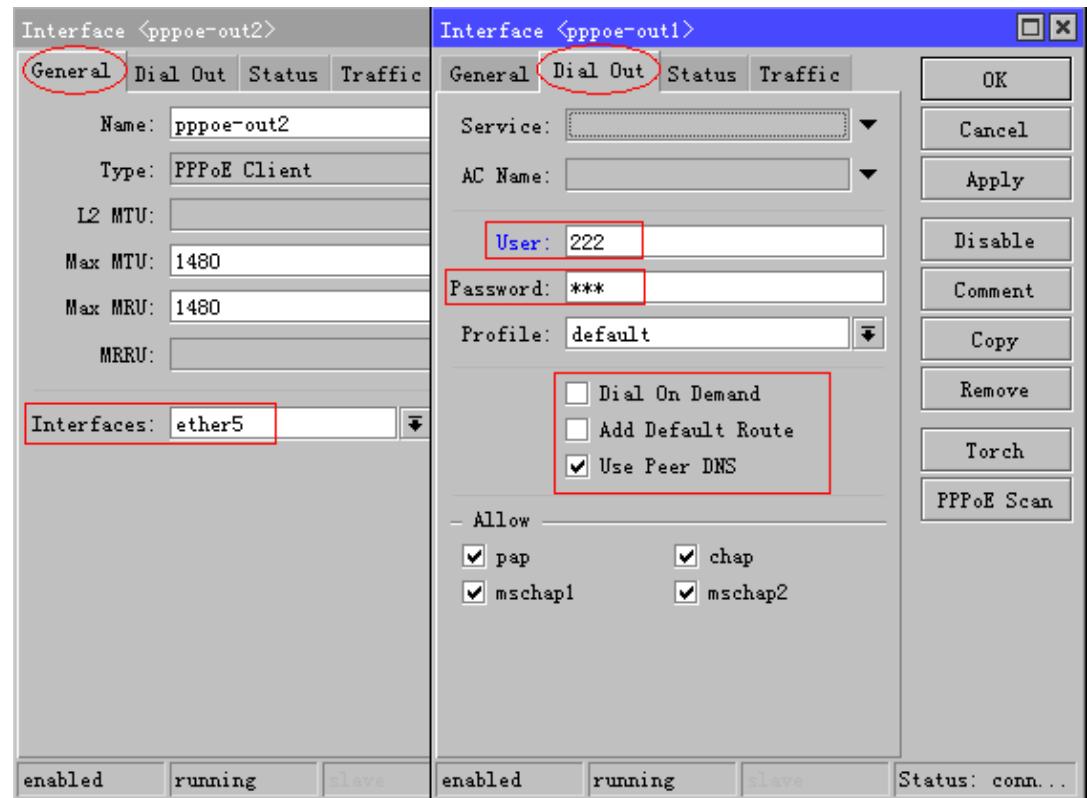
Add default route: 添加默认路由

Use peer DNS: 使用对等DNS



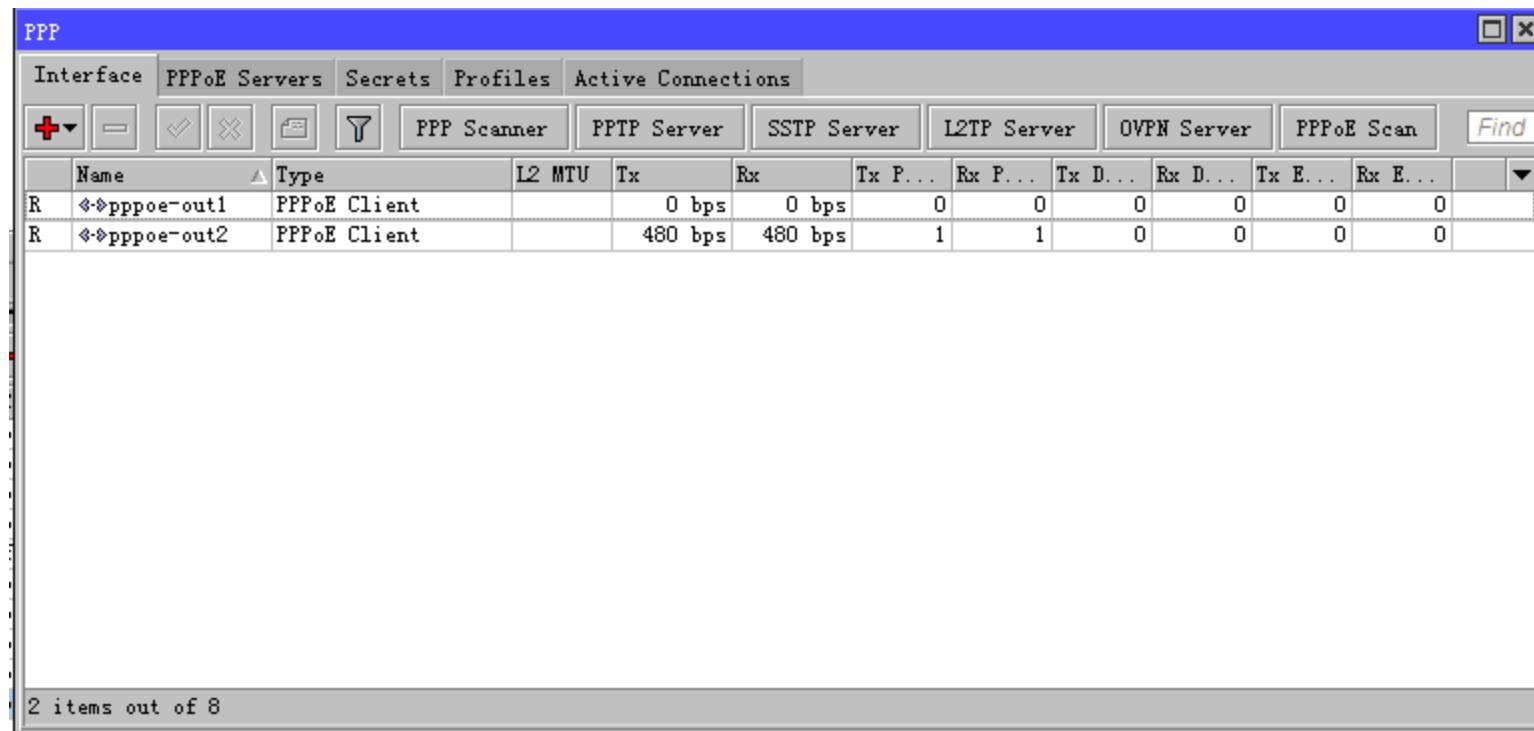
# pppoe

添加另一个pppoe拨号



# pppoe

PPP



	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		480 bps	480 bps	1	1	0	0	0	0	

2 items out of 8

# pppoe

```
/interface pppoe-client
add ac-name="" add-default-route=no allow=pap,chap,mschap1,mschap2 \
dial-on-demand=no disabled=no interface=ether4 max-mru=1480 max-
mtu=1480 \
mrru=disabled name=pppoe-out1 password="" profile=default service-
name="" \
use-peer-dns=yes user=""

add ac-name="" add-default-route=no allow=pap,chap,mschap1,mschap2 \
dial-on-demand=no disabled=no interface=ether5 max-mru=1480 max-
mtu=1480 \
mrru=disabled name=pppoe-out2 password="" profile=default service-
name="" \
use-peer-dns=yes user=""
```

## nat

masquerade 地址伪装：

可以根据src address、out interface或者src address list做地址伪装。

如果是PPPo拨号上网，这里需要注意的是out. Interface

应该选择对应的pppoe-out接口，而不是ether口！

The image displays two side-by-side screenshots of a 'NAT Rule' configuration interface, likely from a network management software. Both screenshots show the 'General' tab selected.

**Left Screenshot (General Tab):**

- Chain:** srcnat (highlighted with a red box)
- Src. Address:** (empty)
- Dst. Address:** (empty)
- Protocol:** (empty)
- Src. Port:** (empty)
- Dst. Port:** (empty)
- Any. Port:** (empty)
- In. Interface:** (empty)
- Out. Interface:**  pppoe-out1 (highlighted with a red box)
- Packet Mark:** (empty)
- Connection Mark:** (empty)
- Routing Mark:** (empty)
- Routing Table:** (empty)
- Connection Type:** (empty)

**Right Screenshot (Action Tab):**

- General** | **Advanced** | **Extra** | **Action** (highlighted with a red box) | **Statistics**
- Action:** masquerade (highlighted with a red box)

# nat

另一个masquerade

NAT Rule ◊				
General	Advanced	Extra	Action	Statistics
Chain: <input type="text" value="srcnat"/>				
Src. Address:				
Dst. Address:				
Protocol:				
Src. Port:				
Dst. Port:				
Any. Port:				
In. Interface:				
Out. Interface: <input type="text" value="pppoe-out2"/>				
Packet Mark:				
Connection Mark:				
Routing Mark:				
Routing Table:				
Connection Type:				

# nat

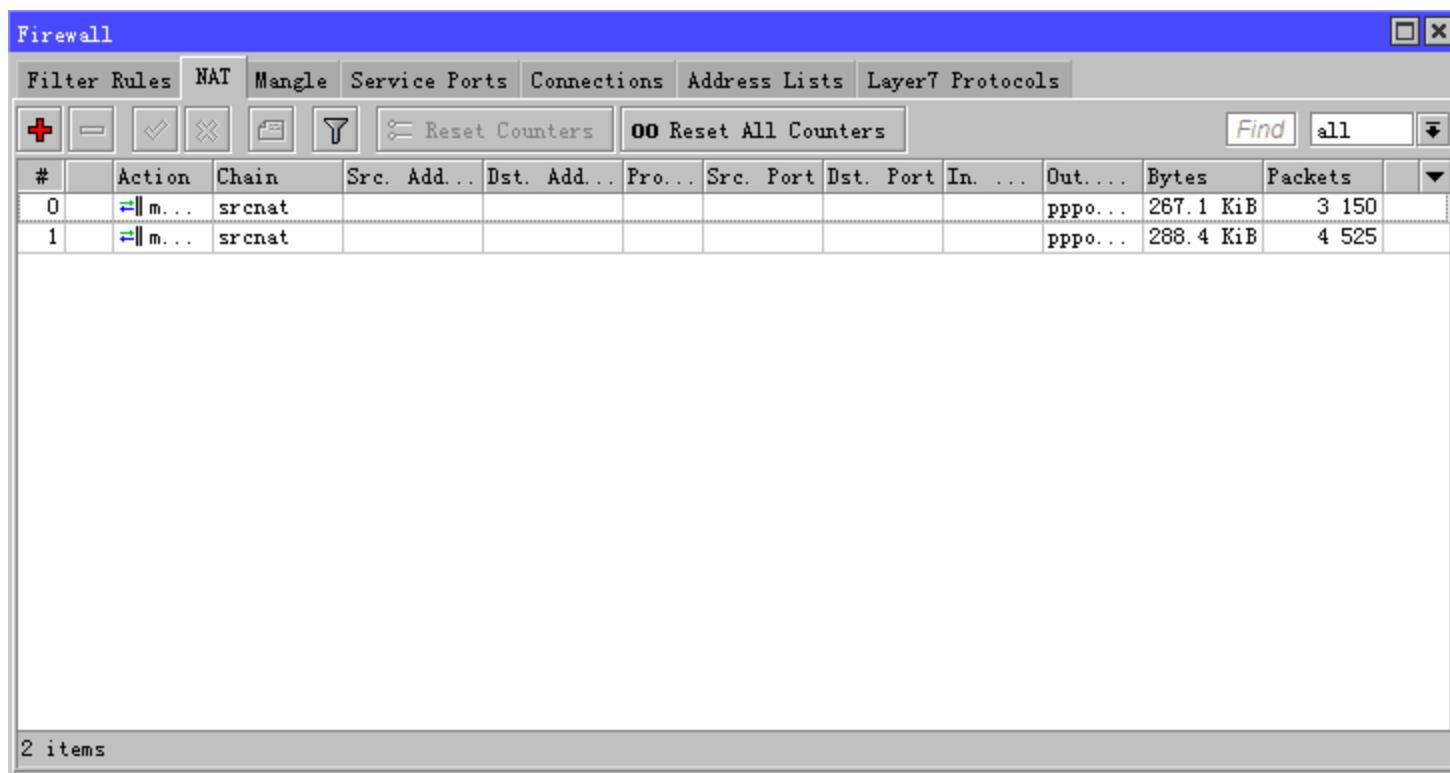
Firewall

Filter Rules NAT Mangle Service Ports Connections Address Lists Layer7 Protocols

**00 Reset All Counters**

#	Action	Chain	Src. Add...	Dst. Add...	Pro...	Src. Port	Dst. Port	In. ...	Out....	Bytes	Packets
0	m...	srcnat							pppo...	267.1 KiB	3 150
1	m...	srcnat							pppo...	288.4 KiB	4 525

2 items

A screenshot of a Firewall configuration window. The title bar says 'Firewall'. The menu bar includes 'Filter Rules', 'NAT' (which is selected), 'Mangle', 'Service Ports', 'Connections', 'Address Lists', and 'Layer7 Protocols'. Below the menu is a toolbar with icons for adding, deleting, and modifying rules, as well as a 'Reset Counters' button and a 'Reset All Counters' button. A search bar with 'Find' and 'all' buttons is also present. The main table displays two rules. Rule 0 has an action of '|| m...' and a chain of 'srcnat'. Rule 1 has an action of '|| m...' and a chain of 'srcnat'. Both rules show traffic statistics for ppp0 interfaces: Rule 0 has 267.1 KiB in 3 150 packets, and Rule 1 has 288.4 KiB in 4 525 packets. The bottom status bar shows '2 items'.

# nat

```
/ip firewall nat
```

```
add action=masquerade chain=srcnat
```

```
    disabled=no out-interface=pppoe-out1
```

```
add action=masquerade chain=srcnat
```

```
    disabled=no out-interface=pppoe-out2
```

# mangle

## 标记连接

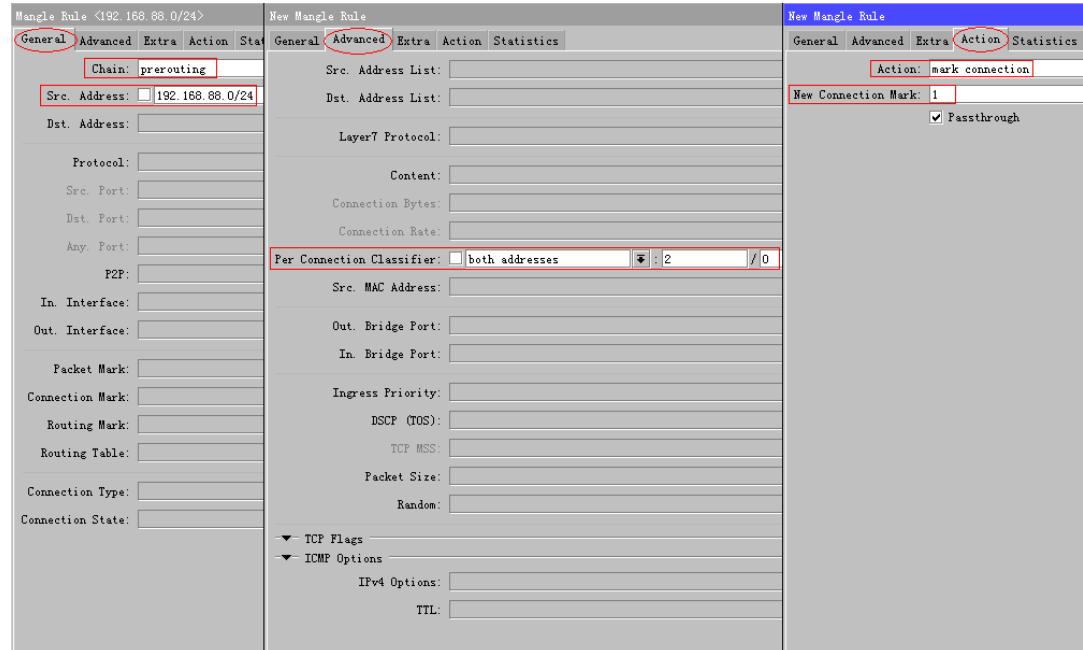
将进入路由的连接进行标记

这里我们用src address来标记

当然，也可以通过in interface选择内网接口来标记

这里我们使用both addresses来将源地址进行分类

2/0: 2条路线，0定义为第一条



# mangle

## both-address(双向地址)

是以源地址和目的地址作为输入值。

如果数据包的源地址和目的地址相同，则连接被分为一组，将得到相同的哈希值。然后把所有组进行平分标记(当然也可以不平分标记)。这些数据包将被分配到同一条外网连接上。

**both-address**是比较稳定的一种设置方法，但不是很平均。

## src-address and port

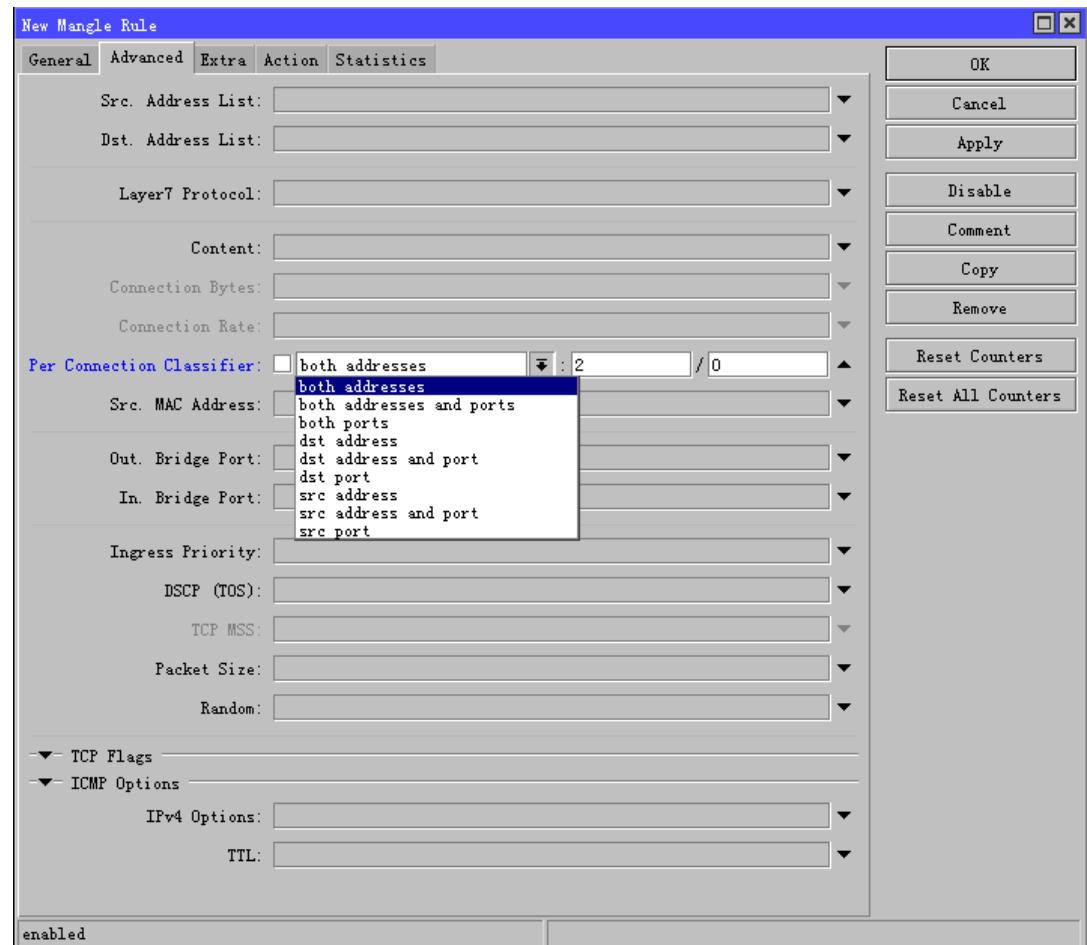
对相同源地址和相同源端口的数据包来说，将会被分配到同一条线路上。这样的话，对于目的地址相同的数据包，也有可能分别走不同的线路，这在对安全性要求比较高的环境中，是不能被接受的。

## src address

这种是负载均衡里面最稳健的。在某些环境中，甚至用**both address**都会出现问题。但是**src-address**是所有模式里面均衡效果最差的，因为兼容性和均衡效果不可得兼。

## both address and ports

是均衡效果最好的。因为带有**port**的输入参数，引入了**port**，而**port**数值从1-65535，因而**hash**的输入样本大大增加，使数据包平均分流到各条线路的概率也就大大增加了！



# mangle

## 标记连接

**Mangle Rule (192.168.88.0/24)**

General	Advanced	Extra	Action	Statistics
Chain: prerouting				
Src. Address:	<input type="text" value="192.168.88.0/24"/>			
Dst. Address:				
Protocol:				
Src. Port:				
Dst. Port:				
Any. Port:				
P2P:				
In. Interface:				
Out. Interface:				
Packet Mark:				
Connection Mark:				
Routing Mark:				
Routing Table:				
Connection Type:				
Connection State:				

**New Mangle Rule**

General	Advanced	Extra	Action	Statistics
Src. Address List:			Action: mark connection	
Dst. Address List:			New Connection Mark: 2	
Layer7 Protocol:			<input checked="" type="checkbox"/> Passthrough	
Content:				
Connection Bytes:				
Connection Rate:				
Per Connection Classifier:	<input type="checkbox"/> both addresses	<input type="button" value=""/>	2	/1
Src. MAC Address:				
Out. Bridge Port:				
In. Bridge Port:				
Ingress Priority:				
DSCP (TOS):				
TCP MSS:				
Packet Size:				
Random:				
▼ TCP Flags				
▼ ICMP Options				
IPv4 Options:				
TTL:				

**New Mangle Rule**

General	Advanced	Extra	Action	Statistics
Action: mark connection				
New Connection Mark: 2				
<input checked="" type="checkbox"/> Passthrough				

# mangle

标记路由

同样标记路由也可以通过src address  
或者in interface进行标记

选择对应的连接标记

然后标记路由，新建一个新的路由  
标记

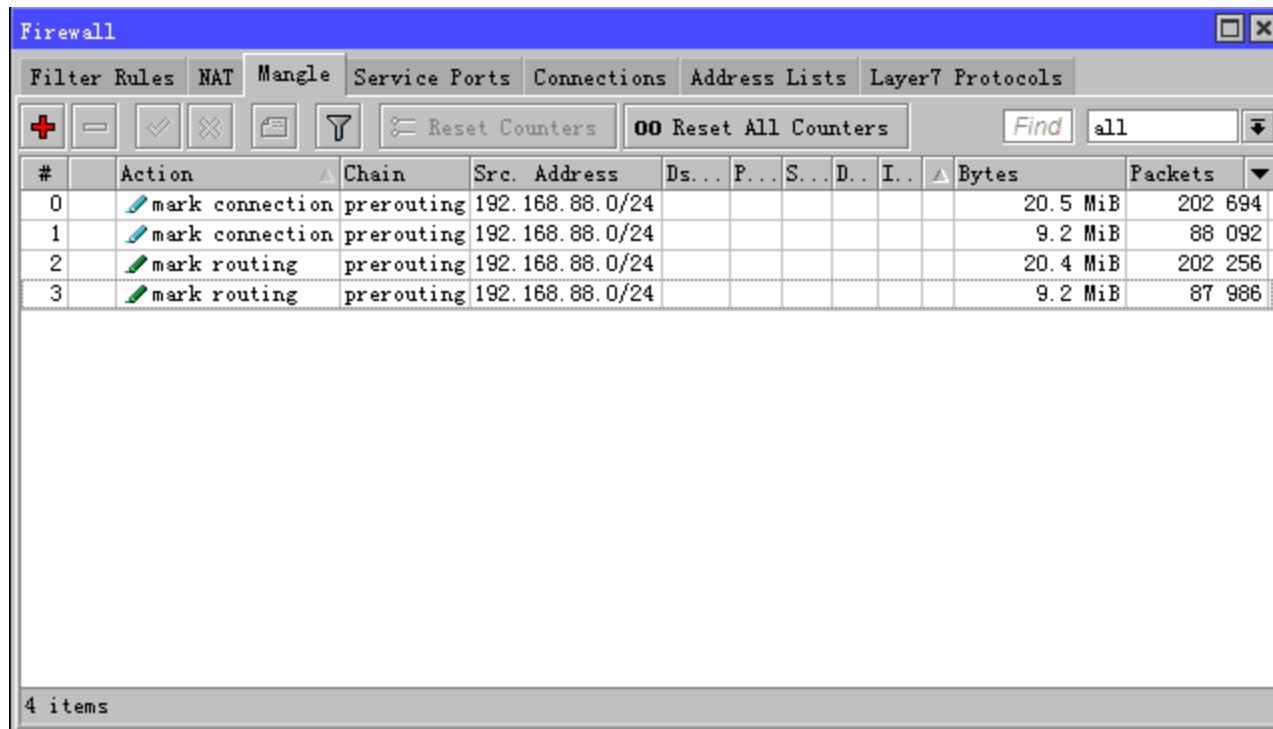
Mangle Rule <192.168.88.0/24>		New Mangle Rule	
General	Advanced	Extra	Action
Chain: <input type="text" value="prerouting"/>	Action: <input type="text" value="mark routing"/>		
Src. Address: <input type="text" value="192.168.88.0/24"/>	New Routing Mark: <input type="text" value="1"/>		
Dst. Address: <input type="text"/>	<input checked="" type="checkbox"/> Passthrough		
Protocol: <input type="text"/>			
Src. Port: <input type="text"/>			
Dst. Port: <input type="text"/>			
Any. Port: <input type="text"/>			
P2P: <input type="text"/>			
In. Interface: <input type="text"/>			
Out. Interface: <input type="text"/>			
Packet Mark: <input type="text"/>			
Connection Mark: <input type="text" value="1"/>			
Routing Mark: <input type="text"/>			
Routing Table: <input type="text"/>			
Connection Type: <input type="text"/>			
Connection State: <input type="text"/>			

# mangle

标记路由

Mangle Rule <192.168.88.0/24>		New Mangle Rule							
General	Advanced	Extra	Action	Statistics	General	Advanced	Extra	Action	Statistics
Chain:	prerouting	Action:	mark routing						
Src. Address:	<input type="text"/> 192.168.88.0/24	New Routing Mark:	2						
Dst. Address:		<input checked="" type="checkbox"/> Passthrough							
Protocol:									
Src. Port:									
Dst. Port:									
Any. Port:									
P2P:									
In. Interface:									
Out. Interface:									
Packet Mark:									
Connection Mark:	<input type="text"/> 2								
Routing Mark:									
Routing Table:									
Connection Type:									
Connection State:									

# mangle



# mangle

```
/ip firewall mangle
add action=mark-connection chain=prerouting disabled=no new-connection-
mark=1 \
    passthrough=yes per-connection-classifier=both-addresses:2/0 src-
    address=\
        192.168.88.0/24
add action=mark-connection chain=prerouting disabled=no new-connection-
mark=2 \
    passthrough=yes per-connection-classifier=both-addresses:2/1 src-
    address=\
        192.168.88.0/24
add action=mark-routing chain=prerouting connection-mark=1 disabled=no \
    new-routing-mark=1 passthrough=yes src-address=192.168.88.0/24
add action=mark-routing chain=prerouting connection-mark=2 disabled=no \
    new-routing-mark=2 passthrough=yes src-address=192.168.88.0/24
```

## route

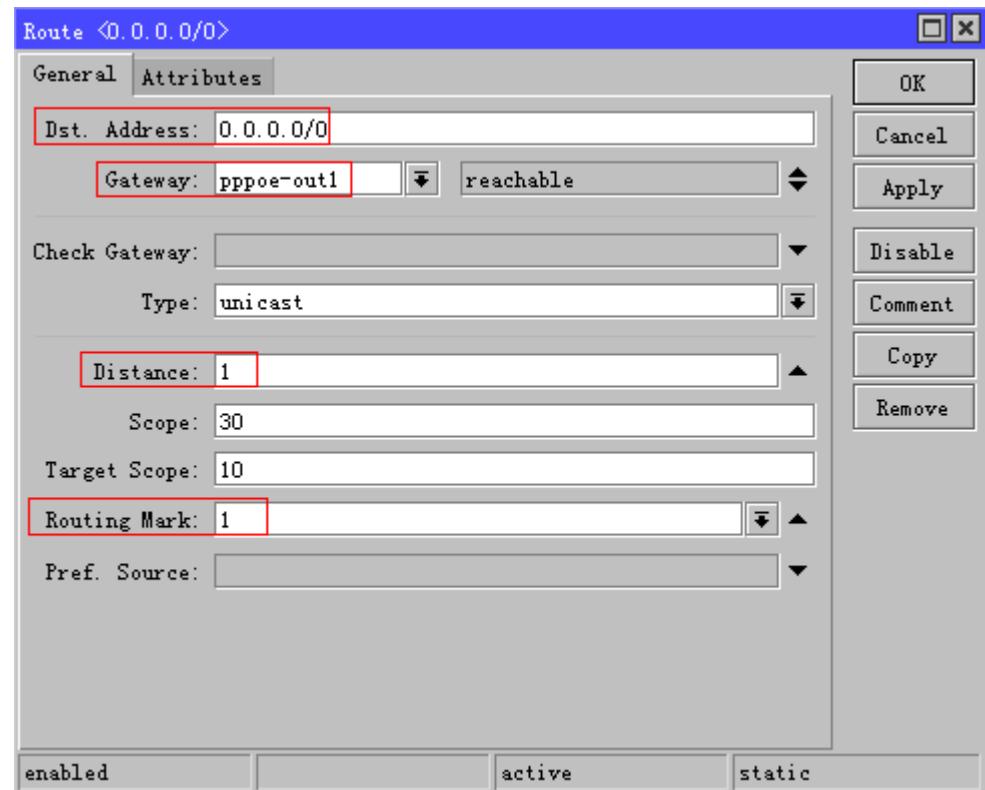
路由标记

所有目的地址走pppoe-out1网关

Distance (距离) 在这里是路由的优先级

分为1~255个级别， 1是最优先（数值越小越优先）

路由标记选择刚才mangle标记的路由1

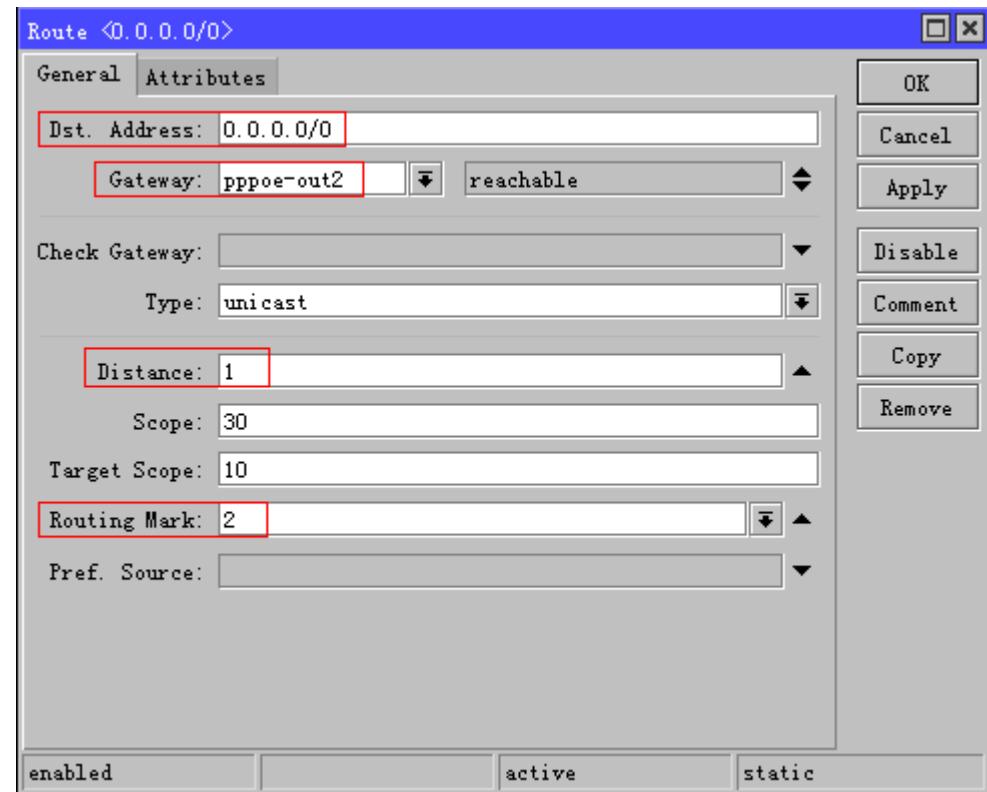


## route

路由标记

所有目的地址走pppoe-out2网关

路由标记选择刚才mangle标记的路由2



## route

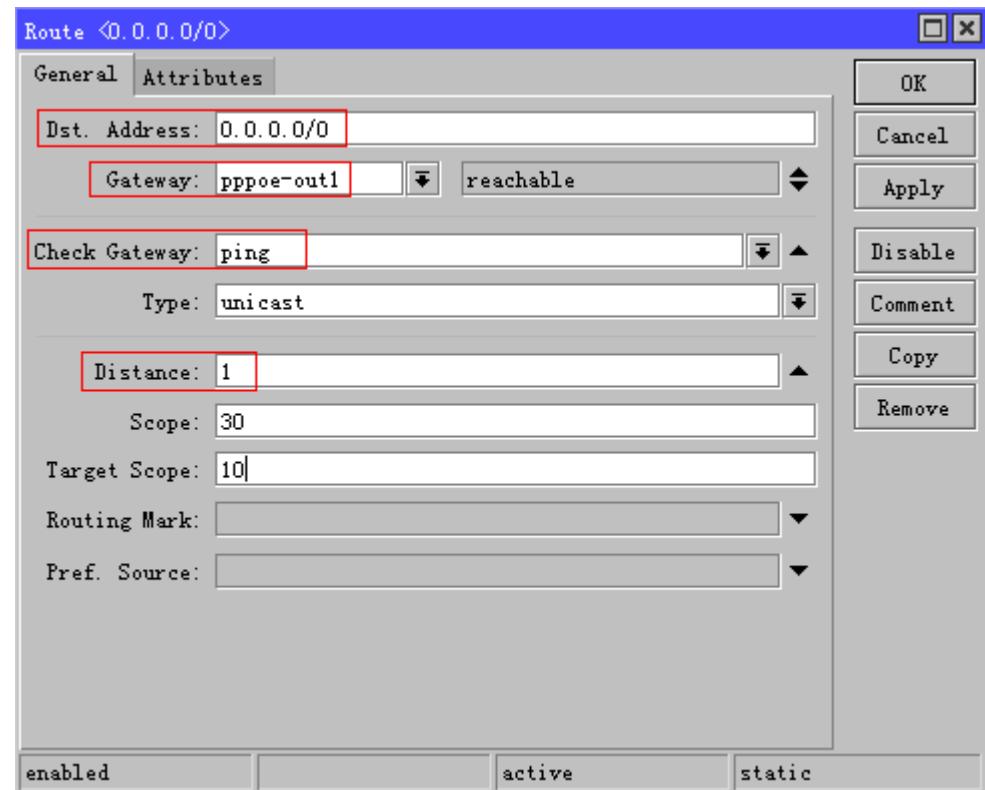
默认网关

Check gateway 检查网关

这里我们用ping网关的方式来判断网络是否通，如果不通路由表则自动切换到另一条路线做默认网关

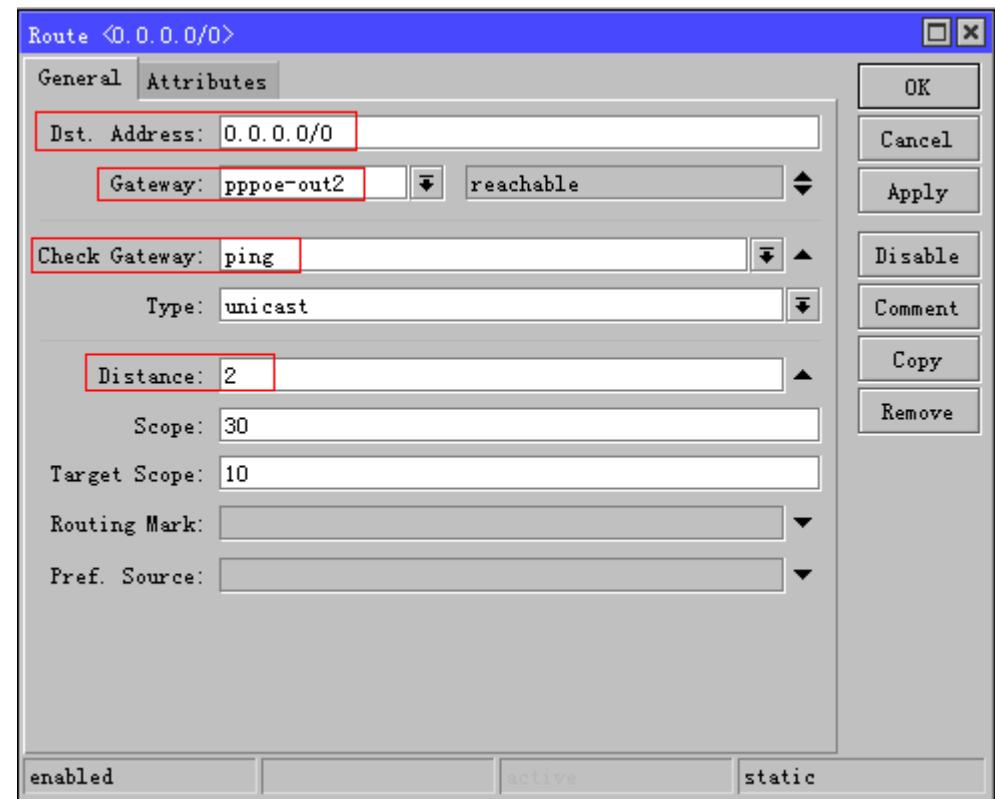
Distance (距离) 在这里是默认网关的优先级

分为1~255个级别，1是最优先（数值越小越优先）



# route

备用网关



# route

Route List

Routes Nexthops Rules VRF

Find all

	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source
AS	▶ 0.0.0.0/0	pppoe-out1 reachable	1	1	
AS	▶ 0.0.0.0/0	pppoe-out2 reachable	1	2	
AS	▶ 0.0.0.0/0	pppoe-out1 reachable	1		
S	▶ 0.0.0.0/0	pppoe-out2 reachable	2		
DAC	▶ 10.10.10.1	pppoe-out2 reachable, pppoe-out1 reachable	0		10.10.10.99
DAC	▶ 192.168.88...	bridge1 reachable	0		192.168.88.1

6 items

# route

```
/ip route
add disabled=no distance=1 dst-address=0.0.0.0/0 gateway=pppoe-
    out1 \
        routing-mark=1 scope=30 target-scope=10
add disabled=no distance=1 dst-address=0.0.0.0/0 gateway=pppoe-
    out2 \
        routing-mark=2 scope=30 target-scope=10
add check-gateway=ping disabled=no distance=1 dst-
    address=0.0.0.0/0 gateway=\
        pppoe-out1 scope=30 target-scope=10
add check-gateway=ping disabled=no distance=2 dst-
    address=0.0.0.0/0 gateway=\
        pppoe-out2 scope=30 target-scope=10
```

# PCC 负载均衡

实际应用中可能遇到的情况：

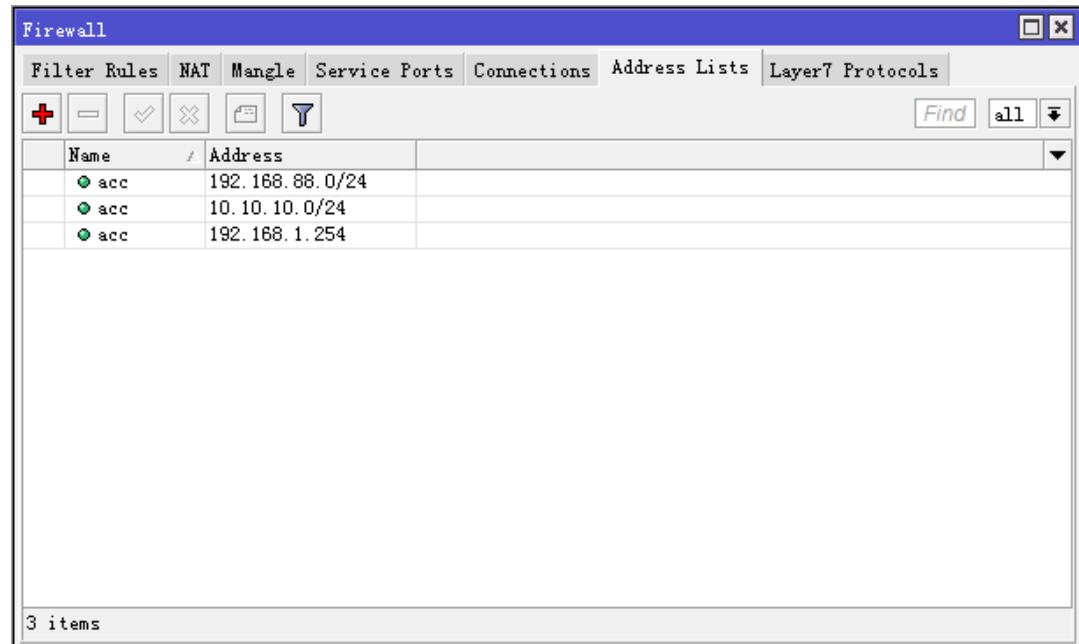
内网多网段或者有服务器需要相互访问  
(排除内网通讯)

外网带宽大小不同，进行PCC负载均衡  
(例如1条4M的带宽跟1条8M的带宽)

# 排除内网通讯

地址列表 (address lists)

添加需要互访的IP或者网段



# 排除内网通讯

在PCC mangle之前先做个accept规则，  
让内网可以互访

New Mangle Rule					Mangle Rule ◇					New Mangle Rule					
General	Advanced	Extra	Action	Statistics	General	Advanced	Extra	Action	Statistics	General	Advanced	Extra	Action	Statistics	
Chain: <input type="text" value="prerouting"/>	Src. Address List: <input type="checkbox"/> <input type="text" value="acc"/>				Src. Address List: <input type="checkbox"/> <input type="text" value="acc"/>				Action: <input type="text" value="accept"/>						
Src. Address: <input type="text"/>	Dst. Address List: <input type="checkbox"/> <input type="text" value="acc"/>				Layer7 Protocol: <input type="text"/>										
Dst. Address: <input type="text"/>	Content: <input type="text"/>				Connection Bytes: <input type="text"/>										
Protocol: <input type="text"/>	Connection Rate: <input type="text"/>				Per Connection Classifier: <input type="text"/>										
Src. Port: <input type="text"/>	Src. MAC Address: <input type="text"/>				Out. Bridge Port: <input type="text"/>										
Dst. Port: <input type="text"/>	In. Bridge Port: <input type="text"/>				In. Interface: <input type="text"/>										
Any. Port: <input type="text"/>	Out. Interface: <input type="text"/>				Packet Mark: <input type="text"/>										
P2P: <input type="text"/>	Connection Mark: <input type="text"/>				Routing Mark: <input type="text"/>										
In. Interface: <input type="text"/>	Routing Table: <input type="text"/>				Connection Type: <input type="text"/>										
Out. Interface: <input type="text"/>	Connection State: <input type="text"/>														
-▼- TCP Flags					Ingress Priority: <input type="text"/>			DSCP (TOS): <input type="text"/>							
-▼- ICMP Options					TCP MSS: <input type="text"/>			Packet Size: <input type="text"/>							
					Random: <input type="text"/>			IPv4 Options: <input type="text"/>							
					TTL: <input type="text"/>										

# 排除内网通讯

根据地址列表 (address list) 做PCC  
标记连接

New Mangle Rule	Mangle Rule <192.168.88.0/24>	New Mangle Rule																																																																																																																																																																							
<table border="1"><tr><th>General</th><th>Advanced</th><th>Extra</th><th>Action</th></tr><tr><td>Chain: <input type="text" value="prerouting"/></td><td>General</td><td>Advanced</td><td>Action</td></tr><tr><td>Src. Address: <input type="text"/></td><td>Src. Address List: <input type="text"/> acc</td><td>Src. Address List: <input type="text"/> acc</td><td>Action: <input type="text" value="mark connection"/></td></tr><tr><td>Dst. Address: <input type="text"/></td><td>Dst. Address List: <input type="text"/> acc</td><td>Layer7 Protocol: <input type="text"/></td><td>New Connection Mark: <input type="text" value="1"/></td></tr><tr><td>Protocol: <input type="text"/></td><td>Content: <input type="text"/></td><td>Per Connection Classifier: <input type="text"/> both addresses <input type="button" value=":"/> 2 <input type="text" value="0"/></td><td><input type="checkbox"/> Passthrough</td></tr><tr><td>Src. Port: <input type="text"/></td><td>Connection Bytes: <input type="text"/></td><td>Src. MAC Address: <input type="text"/></td><td></td></tr><tr><td>Dst. Port: <input type="text"/></td><td>Connection Rate: <input type="text"/></td><td>Out. Bridge Port: <input type="text"/></td><td></td></tr><tr><td>Any. Port: <input type="text"/></td><td>Per Connection Classifier: <input type="text"/> both addresses <input type="button" value=":"/> 2 <input type="text" value="0"/></td><td>In. Bridge Port: <input type="text"/></td><td></td></tr><tr><td>P2P: <input type="text"/></td><td>Src. MAC Address: <input type="text"/></td><td>Ingress Priority: <input type="text"/></td><td></td></tr><tr><td>In. Interface: <input type="text"/></td><td>Out. Bridge Port: <input type="text"/></td><td>DSCP (TOS): <input type="text"/></td><td></td></tr><tr><td>Out. Interface: <input type="text"/></td><td>In. 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Address: <input type="text"/>	Src. Address List: <input type="text"/> acc	Src. Address List: <input type="text"/> acc	Action: <input type="text" value="mark connection"/>	Dst. Address: <input type="text"/>	Dst. Address List: <input type="text"/> acc	Layer7 Protocol: <input type="text"/>	New Connection Mark: <input type="text" value="1"/>	Protocol: <input type="text"/>	Content: <input type="text"/>	Per Connection Classifier: <input type="text"/> both addresses <input type="button" value=":"/> 2 <input type="text" value="0"/>	<input type="checkbox"/> Passthrough	Src. Port: <input type="text"/>	Connection Bytes: <input type="text"/>	Src. MAC Address: <input type="text"/>		Dst. Port: <input type="text"/>	Connection Rate: <input type="text"/>	Out. Bridge Port: <input type="text"/>		Any. Port: <input type="text"/>	Per Connection Classifier: <input type="text"/> both addresses <input type="button" value=":"/> 2 <input type="text" value="0"/>	In. Bridge Port: <input type="text"/>		P2P: <input type="text"/>	Src. MAC Address: <input type="text"/>	Ingress Priority: <input type="text"/>		In. Interface: <input type="text"/>	Out. Bridge Port: <input type="text"/>	DSCP (TOS): <input type="text"/>		Out. Interface: <input type="text"/>	In. Bridge Port: <input type="text"/>	TCP MSS: <input type="text"/>		Packet Mark: <input type="text"/>	Ingress Priority: <input type="text"/>	Packet Size: <input type="text"/>		Connection Mark: <input type="text"/>	DSCP (TOS): <input type="text"/>	Random: <input type="text"/>		Routing Mark: <input type="text"/>	TCP MSS: <input type="text"/>	IPv4 Options: <input type="text"/>		Routing Table: <input type="text"/>	Packet Size: <input type="text"/>	TTL: <input type="text"/>		Connection Type: <input type="text"/>	Random: <input type="text"/>			Connection State: <input type="text"/>	IPv4 Options: <input type="text"/>			<input type="button" value="enabled"/>		<input type="button" value="enabled"/>	<input type="button" value="enabled"/>	<table border="1"><tr><th>General</th><th>Advanced</th><th>Extra</th><th>Action</th><th>Statistics</th></tr><tr><td>Src. Address List: <input type="text"/> acc</td><td>Dst. 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Bridge Port: <input type="text"/>	Ingress Priority: <input type="text"/>	DSCP (TOS): <input type="text"/>			In. Bridge Port: <input type="text"/>	DSCP (TOS): <input type="text"/>	TCP MSS: <input type="text"/>			Ingress Priority: <input type="text"/>	TCP MSS: <input type="text"/>	Packet Size: <input type="text"/>			DSCP (TOS): <input type="text"/>	Packet Size: <input type="text"/>	Random: <input type="text"/>			TCP MSS: <input type="text"/>	Random: <input type="text"/>	IPv4 Options: <input type="text"/>			Packet Size: <input type="text"/>	IPv4 Options: <input type="text"/>	TTL: <input type="text"/>			Random: <input type="text"/>	TTL: <input type="text"/>				IPv4 Options: <input type="text"/>					TTL: <input type="text"/>										<table border="1"><tr><th>General</th><th>Advanced</th><th>Extra</th><th>Action</th><th>Statistics</th></tr><tr><td>Action: <input type="text" value="mark connection"/></td><td>New Connection Mark: <input type="text" value="1"/></td><td><input type="checkbox"/> Passthrough</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	General	Advanced	Extra	Action	Statistics	Action: <input type="text" value="mark connection"/>	New Connection Mark: <input type="text" value="1"/>	<input type="checkbox"/> Passthrough							
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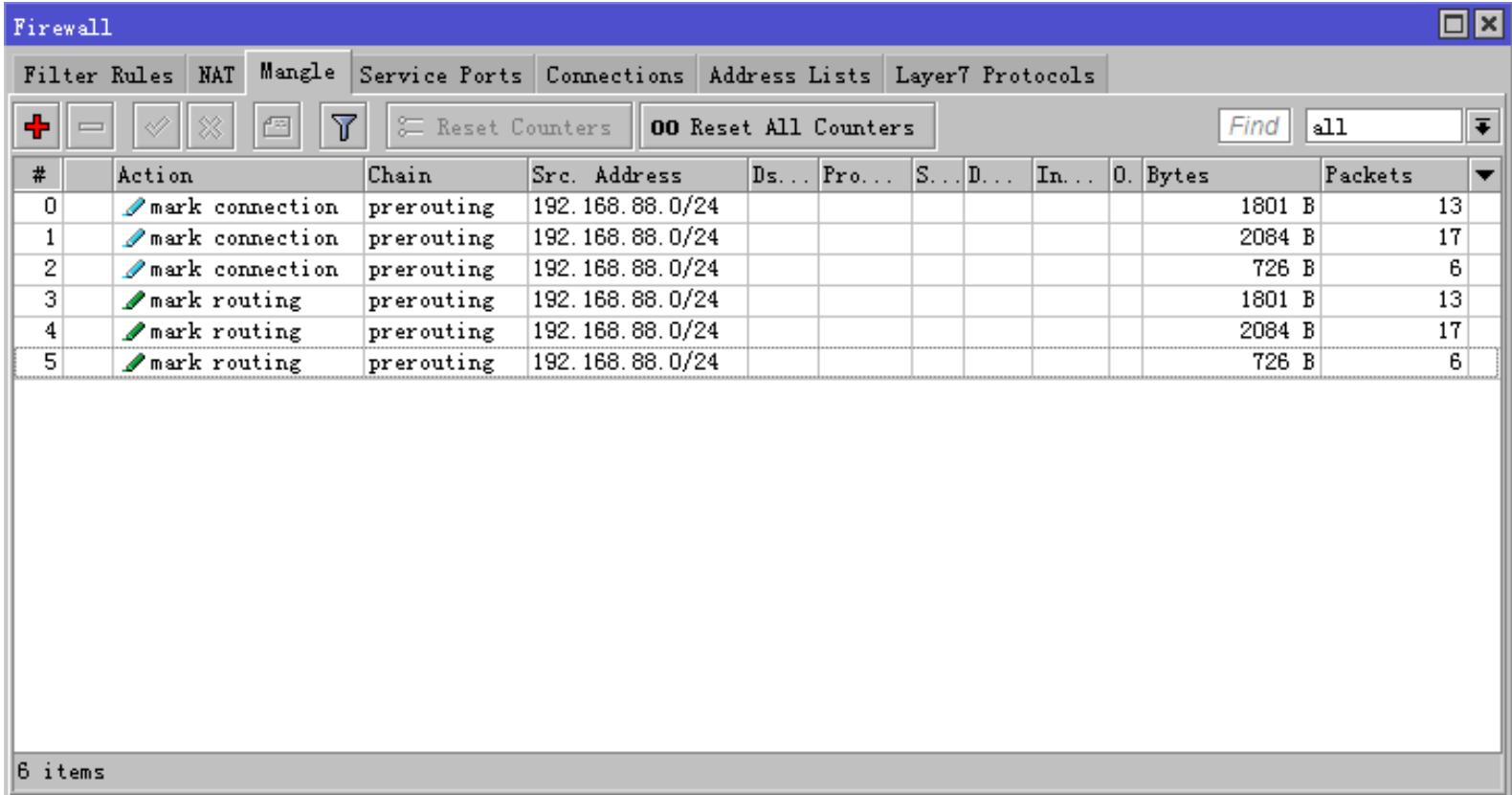
# 排除内网通讯

根据地址列表 (address list) 做PCC  
标记路由

New Mangle Rule		New Mangle Rule		Mangle Rule ◊	
General	Advanced	Extra	Action	General	Advanced
Chain: <input type="text" value="prerouting"/>	Src. Address: <input type="text"/>	Dst. Address: <input type="text"/>	Src. Address List: <input type="checkbox"/> acc	General	Advanced
Protocol: <input type="text"/>	Src. Port: <input type="text"/>	Dst. Port: <input type="text"/>	Dst. Address List: <input checked="" type="checkbox"/> acc	Extra	Extra
Any. Port: <input type="text"/>	P2P: <input type="text"/>	In. Interface: <input type="text"/>	Layer7 Protocol: <input type="text"/>	Action	Action
In. Interface: <input type="text"/>	Out. Interface: <input type="text"/>	Packet Mark: <input type="text"/>	Content: <input type="text"/>	Statistics	Statistics
Connection Mark: <input type="checkbox"/> 1	Routing Mark: <input type="text"/>	Routing Table: <input type="text"/>	Connection Bytes: <input type="text"/>	Action: mark routing	
Connection Type: <input type="text"/>	Connection State: <input type="text"/>	Connection Rate: <input type="text"/>	Per Connection Classifier: <input type="text"/>	New Routing Mark: 1	<input type="checkbox"/> Passthrough
-▼- TCP Flags		Src. MAC Address: <input type="text"/>	Out. Bridge Port: <input type="text"/>		
-▼- ICMP Options		In. Bridge Port: <input type="text"/>	Ingress Priority: <input type="text"/>		
		DSCP (TOS): <input type="text"/>	DSCP (TOS): <input type="text"/>		
		TCP MSS: <input type="text"/>	TCP MSS: <input type="text"/>		
		Packet Size: <input type="text"/>	Packet Size: <input type="text"/>		
		Random: <input type="text"/>	Random: <input type="text"/>		
		IPv4 Options: <input type="text"/>			
		TTL: <input type="text"/>			

# 外网带宽： 4M+8M

做3个PCC标记



The screenshot shows a Windows application window titled "Firewall" with a blue header bar. The header contains several tabs: Filter Rules, NAT, Mangle (which is currently selected and highlighted in blue), Service Ports, Connections, Address Lists, and Layer7 Protocols. Below the tabs is a toolbar with icons for adding (+), deleting (-), modifying (checkmark), deleting (cross), saving (disk), and filtering (magnifying glass). There are also buttons for "Reset Counters" and "00 Reset All Counters". To the right of the toolbar is a search bar with the text "Find" and a dropdown menu set to "all".

The main area is a table with the following columns: #, Action, Chain, Src. Address, Ds..., Pro..., S..., D..., In..., O., Bytes, and Packets. The table contains 6 rows of data:

#	Action	Chain	Src. Address	Ds...	Pro...	S...	D...	In...	O.	Bytes	Packets
0	mark connection	prerouting	192.168.88.0/24							1801 B	13
1	mark connection	prerouting	192.168.88.0/24							2084 B	17
2	mark connection	prerouting	192.168.88.0/24							726 B	6
3	mark routing	prerouting	192.168.88.0/24							1801 B	13
4	mark routing	prerouting	192.168.88.0/24							2084 B	17
5	mark routing	prerouting	192.168.88.0/24							726 B	6

At the bottom left of the table area, there is a message "6 items".

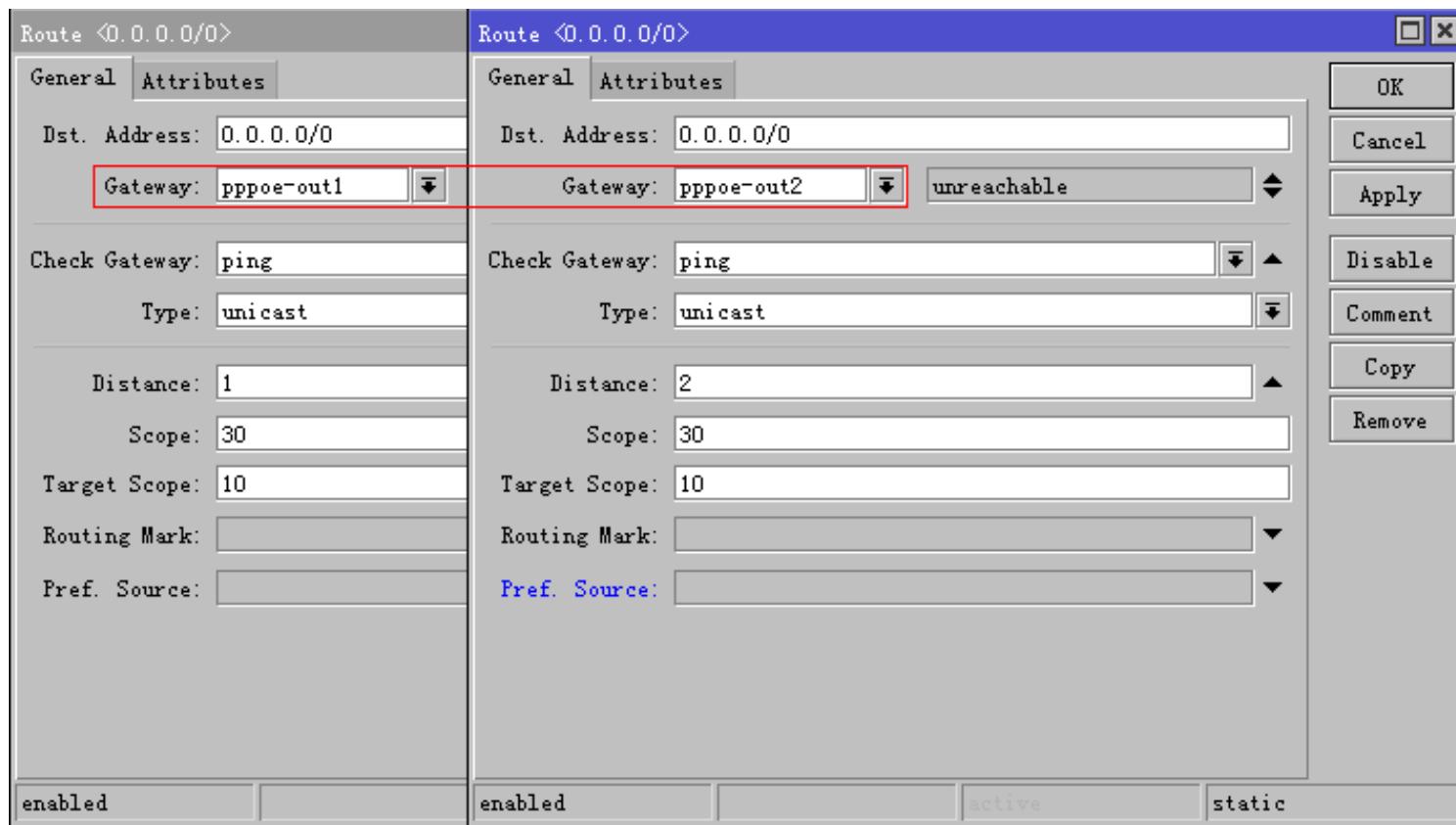
# 外网带宽： 4M+8M

路由标记

Route <0.0.0.0/0>		Route <0.0.0.0/0>		Route <0.0.0.0/0>			
<input type="button" value="General"/> <input type="button" value="Attributes"/>		<input type="button" value="General"/> <input type="button" value="Attributes"/>		<input type="button" value="General"/> <input type="button" value="Attributes"/>		<input type="button" value="OK"/> <input type="button" value="Cancel"/> <input type="button" value="Apply"/> <input type="button" value="Disable"/> <input type="button" value="Comment"/> <input type="button" value="Copy"/> <input type="button" value="Remove"/>	
Dst. Address: 0.0.0.0/0		Dst. Address: 0.0.0.0/0		Dst. Address: 0.0.0.0/0			
Gateway: pppoe-out1		Gateway: pppoe-out2		Gateway: pppoe-out2		unreachable	
Check Gateway: <input type="text"/>		Check Gateway: <input type="text"/>		Check Gateway: <input type="text"/>		▼	
Type: unicast		Type: unicast		Type: unicast		▼	
Distance: 1		Distance: 1		Distance: 1		▲	
Scope: 30		Scope: 30		Scope: 30			
Target Scope: 10		Target Scope: 10		Target Scope: 10			
Routing Mark: 1		Routing Mark: 2		Routing Mark: 3		▼ ▲	
Pref. Source: <input type="text"/>		Pref. Source: <input type="text"/>		Pref. Source: <input type="text"/>		▼	
enabled		enabled		enabled		active static	

# 外网带宽： 4M+8M

默认路由



# 结束

**EDCwifi 林利钢**  
**深圳捷联讯通科技有限公司**