

XÂY DỰNG QoS MẠNG NỘI BỘ

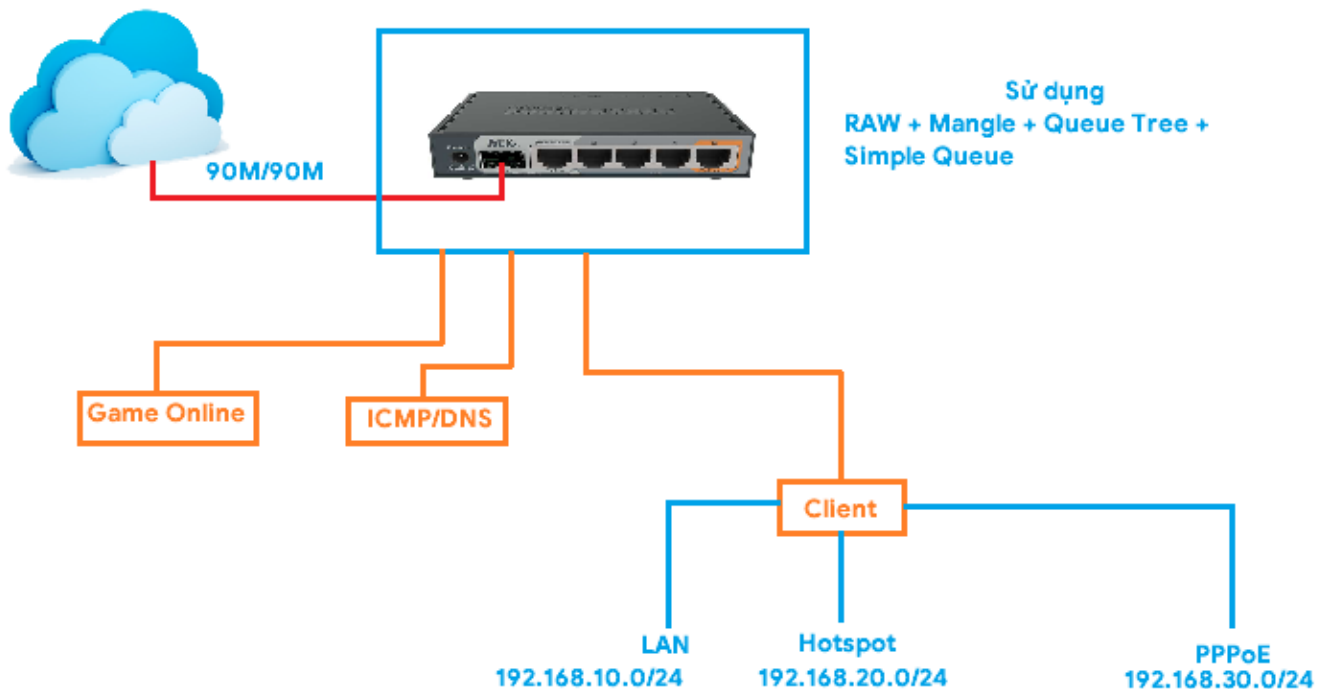
LAN – HOTSPOT – PPPOE

Giới thiệu

- ❑ 1. Xây dựng QoS mạng nội bộ trên nền tảng mạng LAN, Hotspot và mạng phân phối Internet PPPoE.

Cài đặt & vận hành hệ thống

- ❑ Sơ đồ hệ thống vận hành

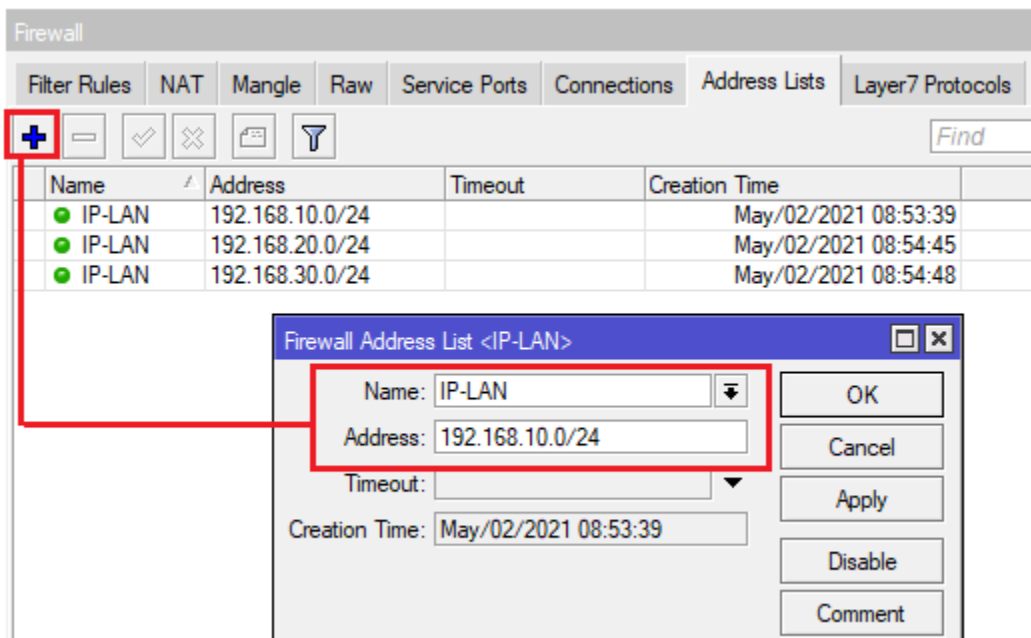


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1. Khởi tạo danh sách địa chỉ.

Tại Menu IP – Firewall và thẻ Address List, chúng ta khởi tạo một danh sách, mang tên IP-LAN hoặc tên bất kỳ. Sau đó, gán các mạng cần tham gia vào mạng QoS.



Trong trường hợp này, chúng tôi muốn QoS cho cả mạng LAN, Hotspot, và mạng PPPoE; chính vì điều này nên chúng tôi gán cả 3 lớp mạng vào cùng một tên danh sách, chẳng hạn IP-LAN.

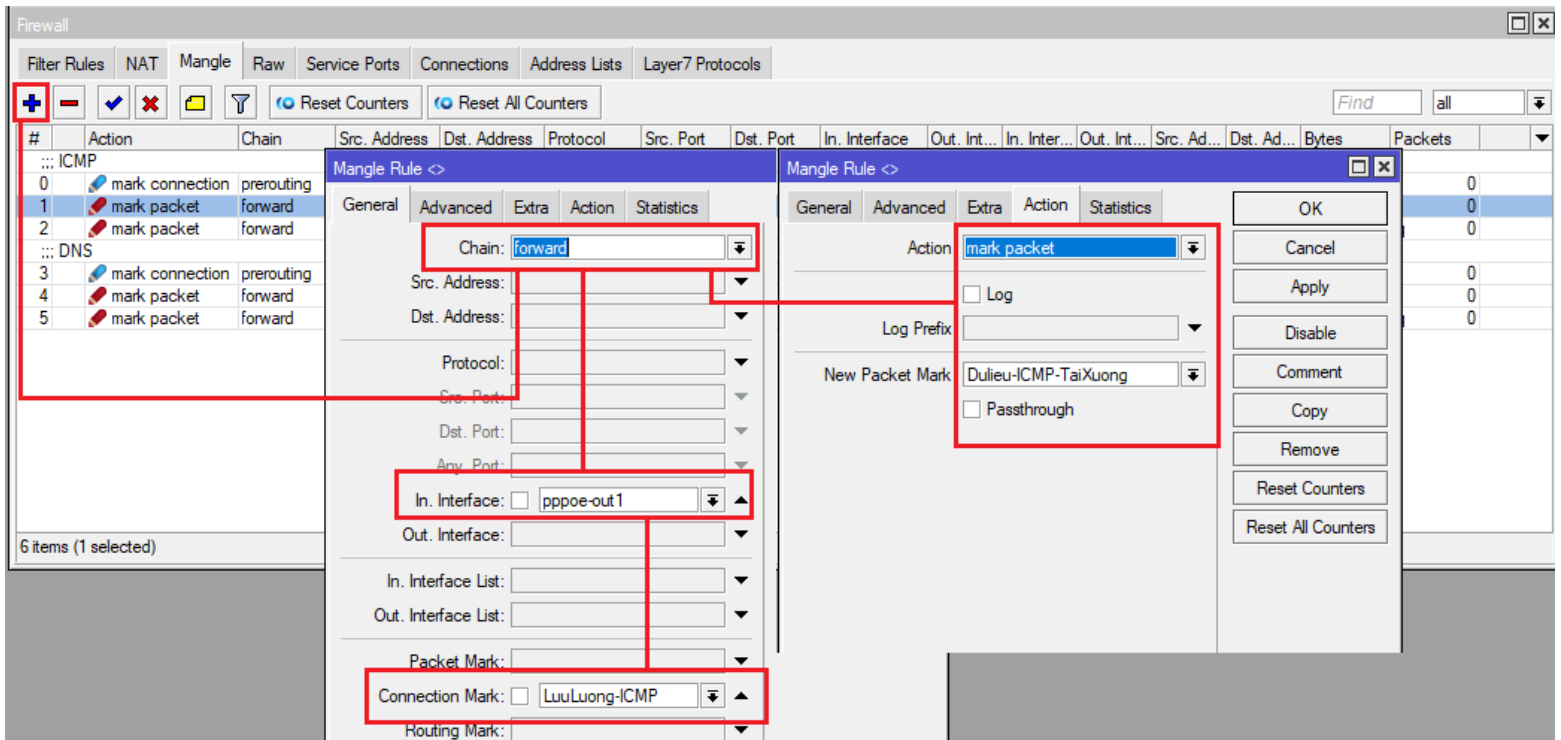
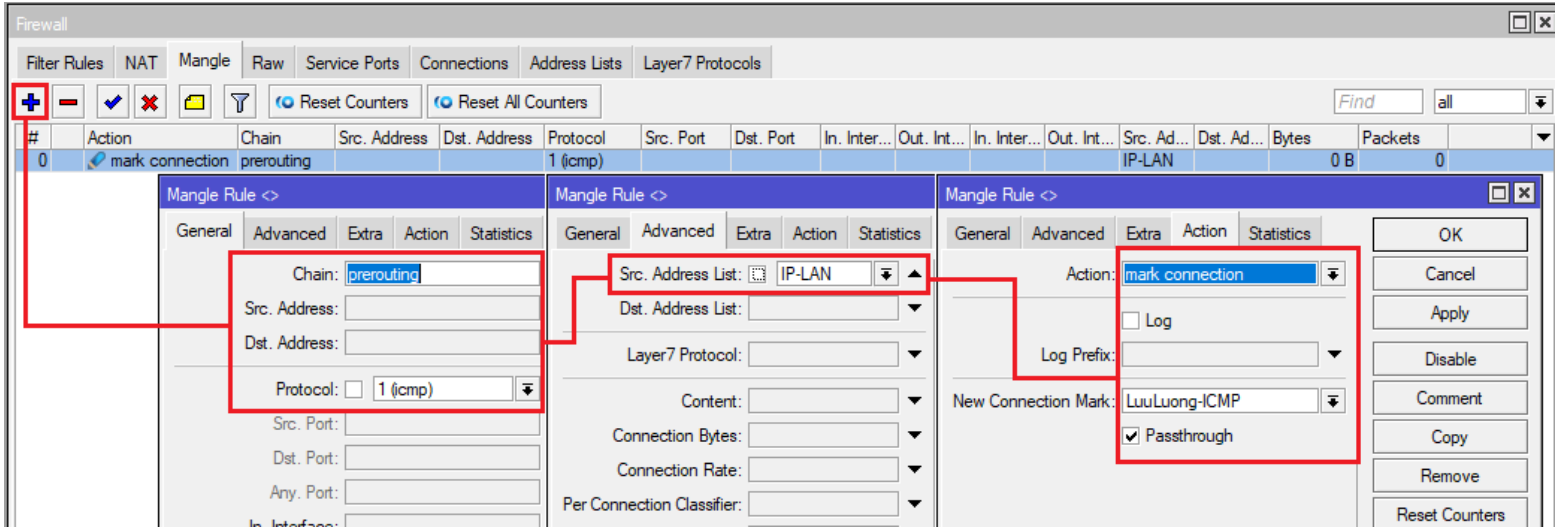
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2. Đánh dấu lưu lượng xuất phát trong mạng, sử dụng thẻ Mangle.

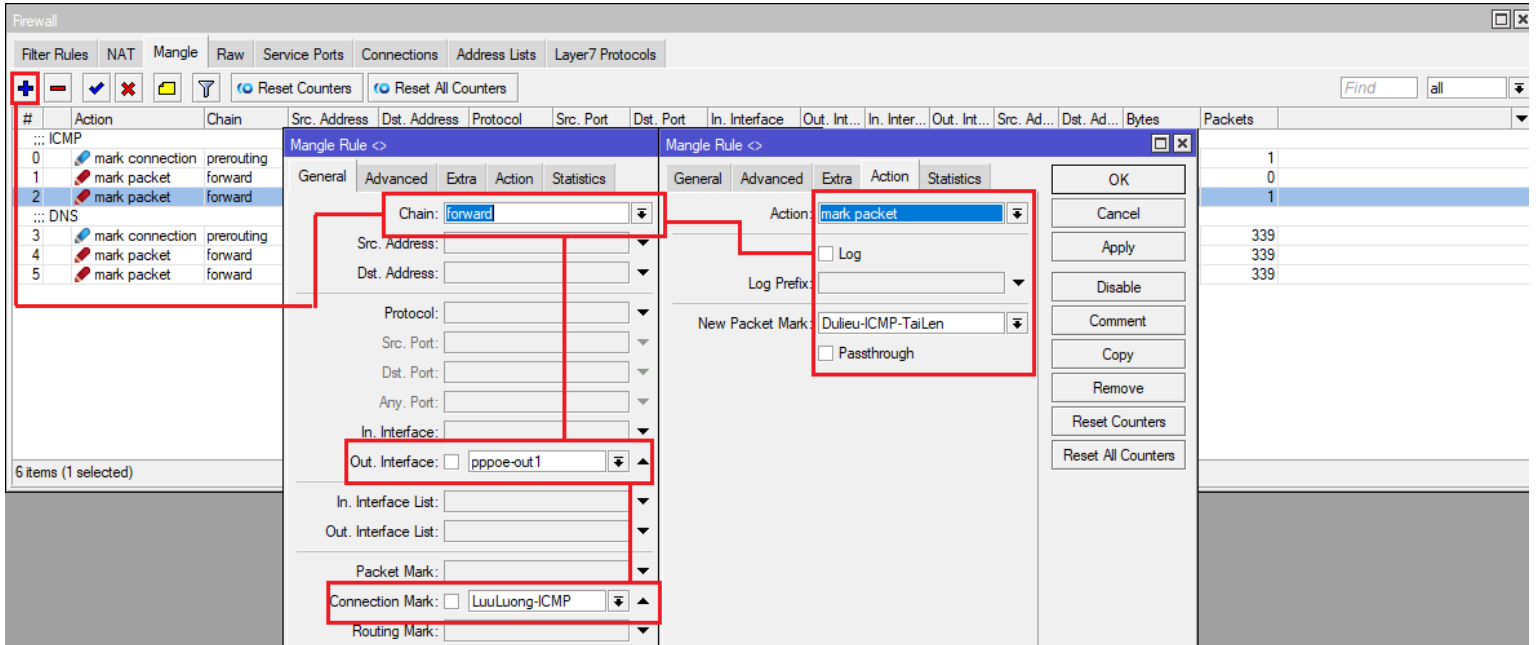
Tại Menu IP – Firewall và thẻ Mangle.

- **Đánh dấu lưu lượng ICMP/DNS xuất phát trong mạng.**
- Đánh dấu lưu lượng DNS và ICMP, xuất phát từ trong mạng ra ngoài Internet (Src Address List không đi đến Src Address List).



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Câu lệnh chuyển đổi:

```
/ip firewall mangle
```

```
add action=mark-connection chain=prerouting comment=ICMP new-connection-mark=LuuLuong-ICMP passthrough=yes protocol=icmp src-address-list=IP-LAN
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-ICMP in-interface=pppoe-out1 new-packet-mark=Dulieu-ICMP-TaiXuong passthrough=no
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-ICMP new-packet-mark=Dulieu-ICMP-TaiLen out-interface=pppoe-out1 passthrough=no
```

```
add action=mark-connection chain=prerouting comment=DNS dst-port=53 new-connection-mark=LuuLuong-DNS passthrough=yes protocol=udp src-address-list=IP-LAN
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-DNS in-interface=pppoe-out1 new-packet-mark=Dulieu-DNS-TaiXuong passthrough=no
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-DNS new-packet-mark=Dulieu-DNS-TaiLen out-interface=pppoe-out1 passthrough=no
```

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- **Đánh dấu lưu lượng Game Online xuất phát trong mạng.**
 - Thông tin chi tiết các cổng mỗi Game.

GAME PORTS

PUBG

TCP : 7889,10012,17500,18081
UDP : 8011,9030,10010-10650,11000-14000,17000,20000,20001,20002

FREE FIRE

TCP : 7006,14000,20561,39698,39779,39003
UDP : 7008,10000-10009,17000

MOBILE LEGENDS

TCP : 5500-5700,8001,30000-30300,9000-9010
30097-30147,30000-30150,9001,30101-30105,5057,5228,5001-5009,
5520-5529,5551,5651,5153
UDP : 5000-5200,5500-5700,8001,30000-30300,9000-9010
5601-5602,5025,5605,5005,5503,5101-5109,5001-5009,30101,
5520-5529,5020-5024,5501-5509,5517

POINT BLANK

TCP : 39190-39200,49001-49190
UDP : 40000-40010

AOV

TCP : 10001-10094
UDP : 10101-10201,10080-10110,17000-18000

GARENA LEAGUE OF LEGEND (LOL):

TCP : 2080-2099
UDP : 5100

DOTA 2

TCP : 9100-9200,8230-8250,8110-8120,27000-28998
UDP : 27000-28998,39000

FIFA ONLINE

TCP : 7770-7790
UDP : 16300-16350

CALL OF DUTY MOBILE

TCP : 3013,18082,65010,65050
UDP : 7500-7700,17000-20100

LYTO CROSS FIRE

TCP : 10009,13008,16666,28012
UDP : 12060-12070,13000-13080

ORIGIN APEX LEGENDS

TCP: 9960-9969,1024-1124,3216,18000,18120,18060,27900,28910,29900
UDP: 1024-1124,18000,29900,37000-40000

GRAND CHASE

TCP : 9300,9400,9700
UDP : 9401,9600,16440-16450

WORLD IN AYODANCE

TCP : 52510,53100-53110,54100,55100

Clash of God

TCP : 9430-9450,5220-5230

BASIC PORTS

80,81,443,8000-8081,21,22,23,81,88,5050,843,182,53

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Sau đó, thực hiện đánh dấu tương ứng cho mỗi cổng Game này.

- Danh sách câu lệnh cài đặt.

```
/ip firewall mangle
```

```
add action=mark-connection chain=prerouting comment="Game PUBG" dst-  
port=5222,5228,7889,10012,17500,18081 new-connection-mark=LuuLuong-Game  
passthrough=yes protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=8011,9030,10010-10650,11000-  
14000,20000,20001,20002,17000 new-connection-mark=LuuLuong-Game  
passthrough=yes protocol=udp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting comment="Game FREE FIRE" dst-  
port=7006,14000,20561,39698,39779,39003 new-connection-mark=LuuLuong-Game  
passthrough=yes protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=7008,10000-10009,17000 new-  
connection-mark=LuuLuong-Game passthrough=yes protocol=udp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting comment="Game MOBILE LEGENDS" dst-  
port=5500-5700,8001,30000-30300,9000-9010 new-connection-mark=LuuLuong-Game  
passthrough=yes protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=30097-30147,30000-  
30150,9001,30101-30105,5057,5228,5001-5009 new-connection-mark=LuuLuong-Game  
passthrough=yes protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=5520-5529,5551,5651,5153 new-  
connection-mark=LuuLuong-Game passthrough=yes protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=5000-5200,5500-  
5700,8001,30000-30300,9000-9010 new-connection-mark=LuuLuong-Game  
passthrough=yes protocol=udp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=5601-  
5602,5025,5605,5005,5503,5101-5109,5001-5009,30101 new-connection-mark=LuuLuong-  
Game passthrough=yes protocol=udp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=5520-5529,5020-5024,5501-  
5509,5517 new-connection-mark=LuuLuong-Game passthrough=yes protocol=udp src-  
address-list=IP-LAN
```

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```
add action=mark-connection chain=prerouting comment="Game POINT BLANK" dst-  
port=39190-39200,49001-49190 new-connection-mark=LuuLuong-Game passthrough=yes  
protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=40000-40010 new-connection-  
mark=LuuLuong-Game passthrough=yes protocol=udp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting comment="Game AOV" dst-port=10001-  
10094 new-connection-mark=LuuLuong-Game passthrough=yes protocol=tcp src-address-  
list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=10101-10201,10080-10110,17000-  
18000 new-connection-mark=LuuLuong-Game passthrough=yes protocol=udp src-  
address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting comment="Game ORIGIN APEX LEGENDS"  
dst-port=9960-9969,1024-1124,3216,18000,18120,18060,27900,28910,29900 new-  
connection-mark=LuuLuong-Game passthrough=yes protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting dst-port=1024-1124,18000,29900,37000-  
40000 new-connection-mark=LuuLuong-Game passthrough=yes protocol=udp src-  
address-list=IP-LAN
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Game in-  
interface=pppoe-out1 new-packet-mark=Dulieu-Game-TaiXuong passthrough=no
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Game new-packet-  
mark=Dulieu-Game-TaiLen out-interface=pppoe-out1 passthrough=no
```

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- Đánh dấu lưu lượng chung chung xuất phát trong mạng.

- Lưu lượng mạng chung chung là gì ? Đó là các lưu lượng như FPT, SSH, Telnet, https, http...

```
/ip firewall mangle
```

```
add action=mark-connection chain=prerouting comment="Ung Dung Chung Chung"
```

```
connection-mark=!LuuLuong-Game dst-port=80,81,443,8000-
```

```
8081,21,22,23,81,88,5050,843,182,53 new-connection-mark=LuuLuong-ChungChung
```

```
passthrough=yes protocol=tcp src-address-list=IP-LAN
```

```
add action=mark-connection chain=prerouting connection-mark=!LuuLuong-Game dst-
```

```
port=80,81,443,8000-8081,21,22,23,81,88,5050,843,182,53 new-connection-mark=LuuLuong-
```

```
ChungChung passthrough=yes protocol=udp src-address-list=IP-LAN
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-ChungChung in-
```

```
interface=pppoe-out1 new-packet-mark=Dulieu-ChungChung-TaiXuong passthrough=yes
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-ChungChung new-
```

```
packet-mark=Dulieu-ChungChung-TaiLen out-interface=pppoe-out1 passthrough=yes
```

- Đánh dấu lưu lượng Youtube xuất phát trong mạng.

```
/ip firewall mangle
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h
```

```
chain=prerouting comment="IP YOUTUBE" content=googlevideo.com
```

```
add action=mark-connection chain=prerouting dst-address-list=IP-MXH new-connection-
```

```
mark=LuuLuong-Youtube passthrough=yes src-address-list=IP-LAN
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Youtube in-
```

```
interface=pppoe-out1 new-packet-mark=Dulieu-MXH-TaiXuong passthrough=yes
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Youtube new-packet-
```

```
mark=Dulieu-MXH-TaiLen out-interface=pppoe-out1 passthrough=yes
```

- Đánh dấu lưu lượng Facebook xuất phát trong mạng.

```
/ip firewall mangle
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h
```

```
chain=prerouting comment="IP Facebook" content=.facebook.com
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h
```

```
chain=prerouting content=.facebook.net
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h
```

```
chain=prerouting content=.fbcdn.net
```


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```
add action=mark-connection chain=prerouting dst-address-list= IP-MXH new-connection-  
mark=LuuLuong-Facebook passthrough=yes src-address-list=IP-LAN
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Facebook in-  
interface=pppoe-out1 new-packet-mark=Dulieu-MXH-TaiXuong passthrough=yes
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Facebook new-  
packet-mark=Dulieu-MXH-TaiLen out-interface=pppoe-out1 passthrough=yes
```

- Đánh dấu lưu lượng Tiktok xuất phát trong mạng.

```
/ip firewall mangle
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h  
chain=prerouting comment="IP Tiktok" content=.tiktokcdn.com
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h  
chain=prerouting content=tiktokv.com
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h  
chain=prerouting content=.amemv.com
```

```
add action=add-dst-to-address-list address-list=IP-MXH address-list-timeout=5h  
chain=prerouting content=.musical.ly
```

```
add action=mark-connection chain=prerouting dst-address-list= IP-MXH new-connection-  
mark=LuuLuong-Tiktok passthrough=yes src-address-list=IP-LAN
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Tiktok in-  
interface=pppoe-out1 new-packet-mark=Dulieu-MXH-TaiXuong passthrough=yes
```

```
add action=mark-packet chain=forward connection-mark=LuuLuong-Tiktok new-packet-  
mark=Dulieu-MXH-TaiLen out-interface=pppoe-out1 passthrough=yes
```

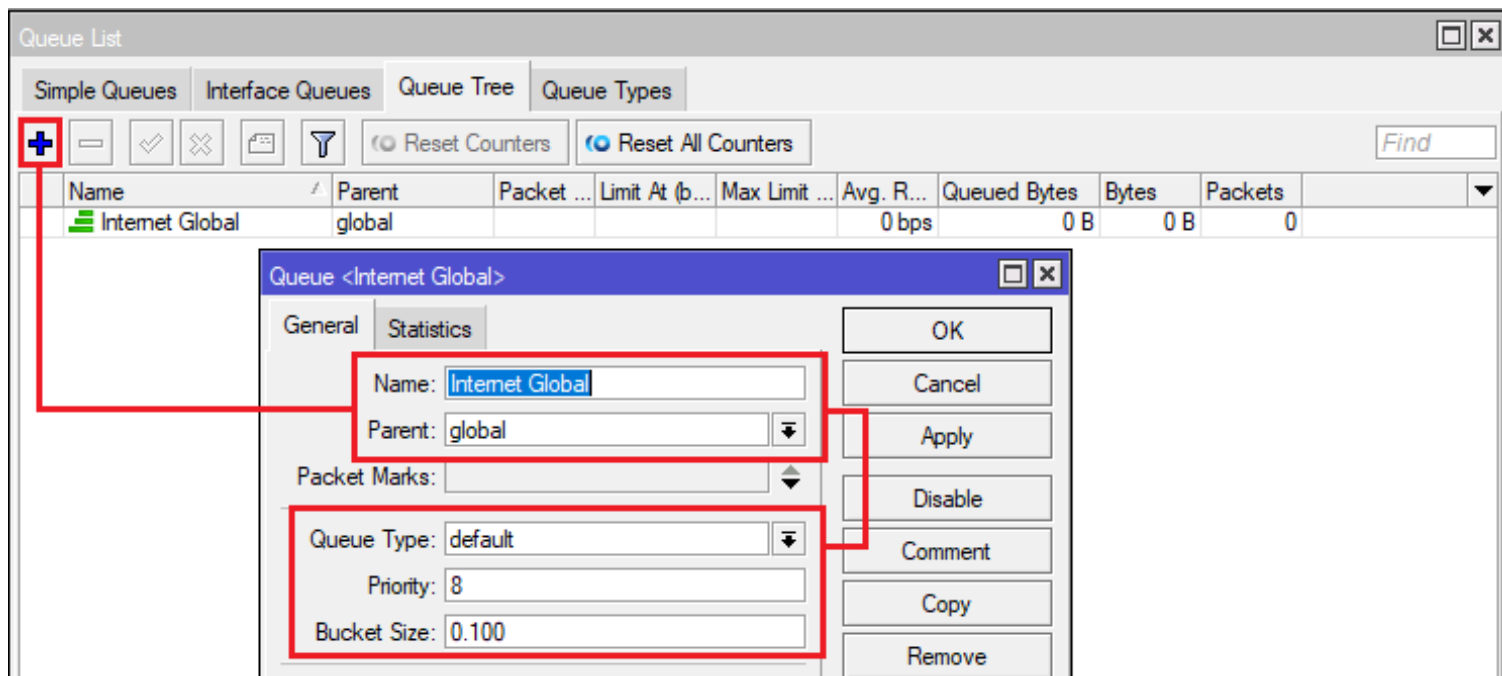
! Tất cả các lưu lượng Youtube, Facebook, Tiktok được đánh dấu Dulieu-MXH-TaiLen & Dulieu-MXH-TaiXuong.

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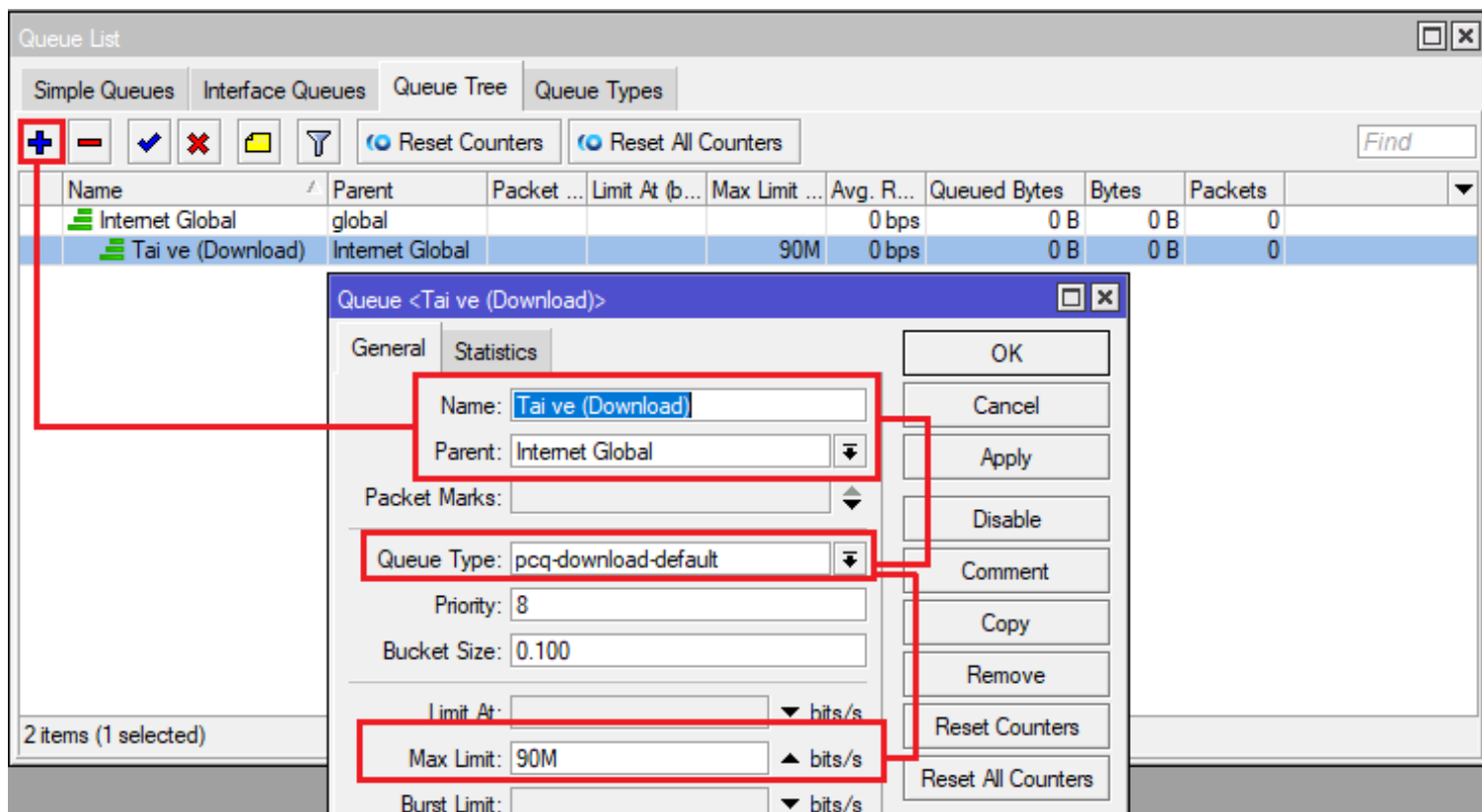
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3. Thiết lập bảng thông mạng.

- Khởi tạo cây lưu lượng chung trên hệ thống



- Khởi tạo cây băng thông tải về trên hệ thống.



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- Khởi tạo cây tải xuống trên hệ thống.

The screenshot shows the Mikrotik Queue List interface. The 'Queue List' window is open, displaying a table of queues. The 'Tai len (Upload)' queue is selected. A dialog box titled 'Queue <Tai len (Upload)>' is open, showing the configuration for this queue. The 'Name' field is 'Tai len (Upload)', the 'Parent' is 'Internet Global', and the 'Queue Type' is 'pcq-upload-default'. The 'Max Limit' is set to '90M'. The 'Limit At' field is empty. The 'Priority' is '8' and the 'Bucket Size' is '0.100'. The 'Burst Limit' field is empty. The 'Packet Marks' field is empty. The 'OK' button is highlighted.

Name	Parent	Packet ...	Limit At (b...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				0 bps	0 B	0 B	0
Tai len (Upload)	Internet Global			90M	0 bps	0 B	0 B	0
Tai ve (Download)	Internet Global			90M	0 bps	0 B	0 B	0

- Đưa lưu lượng Game Online vào trên cây Tải xuống

The screenshot shows the Mikrotik Queue List interface. The 'Queue List' window is open, displaying a table of queues. The 'Game - Tai xuong' queue is selected. A dialog box titled 'Queue <Game - Tai xuong>' is open, showing the configuration for this queue. The 'Name' field is 'Game - Tai xuong', the 'Parent' is 'Tai xuong (Download)', and the 'Queue Type' is 'pcq-download-default'. The 'Max Limit' is set to '90M'. The 'Limit At' field is empty. The 'Priority' is '1' and the 'Bucket Size' is '0.100'. The 'Burst Limit' field is empty. The 'Packet Marks' field is 'Dulieu-Game-TaiXuong'. The 'OK' button is highlighted.

Name	Parent	Packet Marks	Limit At ...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				0 bps	0 B	0 B	0
Tai xuong (Download)	Internet Global			90M	0 bps	0 B	0 B	0
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong			0 bps	0 B	0 B	0
Tai len (Upload)	Internet Global			90M	0 bps	0 B	0 B	0

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- Đưa lưu lượng Game Online vào trên cây Tải lên

The screenshot shows the Mikrotik Queue List interface. A red box highlights the '+' icon in the toolbar, indicating the action to add a new queue. The main table lists the following queues:

Name	Parent	Packet Marks	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				0 bps	0 B	0 B	0
Tai xuong (Download)	Internet Global			90M	0 bps	0 B	0 B	0
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong			0 bps	0 B	0 B	0
Tai len (Upload)	Internet Global			90M	0 bps	0 B	0 B	0
Game - Tai len	Tai len (Upload)	Dulieu-Game-TaiLen			0 bps	0 B	0 B	0

The 'Queue <Game - Tai len>' configuration dialog is open, showing the following settings:

- Name: Game - Tai len
- Parent: Tai len (Upload)
- Packet Marks: Dulieu-Game-TaiLen
- Queue Type: pcq-upload-default
- Priority: 1
- Bucket Size: 0.100

- Đưa lưu lượng ICMP vào trên cây Tải xuống.

The screenshot shows the Mikrotik Queue List interface. A red box highlights the '+' icon in the toolbar, indicating the action to add a new queue. The main table lists the following queues:

Name	Parent	Packet Marks	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				992 bps	0 B	11.3 KiB	146
Tai xuong (Download)	Internet Global			90M	992 bps	0 B	11.2 KiB	144
ICMP - Tai xuong	Tai xuong (Download)	Dulieu-ICMP-TaiXuong			0 bps	0 B	0 B	0
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong			992 bps	0 B	11.2 KiB	144
Tai len (Upload)	Internet Global			90M	0 bps	0 B	132 B	2
Game - Tai len	Tai len (Upload)	Dulieu-Game-TaiLen			0 bps	0 B	132 B	2

The 'Queue <ICMP - Tai xuong>' configuration dialog is open, showing the following settings:

- Name: ICMP - Tai xuong
- Parent: Tai xuong (Download)
- Packet Marks: Dulieu-ICMP-TaiXuong
- Queue Type: pcq-download-default
- Priority: 1
- Bucket Size: 0.100

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- Đưa lưu lượng ICMP vào trên cây Tải lên

The screenshot shows the Mikrotik Queue List interface. A red box highlights the '+' icon in the top left corner, indicating the 'Add' button. Below the table, a dialog box titled 'Queue <ICMP - Tai len>' is open, showing the configuration for a new queue. The configuration fields are:

- Name: ICMP - Tai len
- Parent: Tai len (Upload)
- Packet Marks: Dulieu-ICMP-TaiLen
- Queue Type: pcq-upload-default
- Priority: 1
- Bucket Size: 0.100

Name	Parent	Packet Marks	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				0 bps	0 B	11.9 KiB	155
Tai xuong (Download)	Internet Global			90M	0 bps	0 B	11.5 KiB	149
ICMP - Tai xuong	Tai xuong (Download)	Dulieu-ICMP-TaiXuong			0 bps	0 B	0 B	0
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong			0 bps	0 B	11.5 KiB	149
Tai len (Upload)	Internet Global			90M	0 bps	0 B	394 B	6
ICMP - Tai len	Tai len (Upload)	Dulieu-ICMP-TaiLen			0 bps	0 B	0 B	0
Game - Tai len	Tai len (Upload)	Dulieu-Game-TaiLen			0 bps	0 B	394 B	6

- Đưa lưu lượng DNS vào trên cây Tải xuống

The screenshot shows the Mikrotik Queue List interface. A red box highlights the '+' icon in the top left corner, indicating the 'Add' button. Below the table, a dialog box titled 'Queue <DNS - Tai xuong>' is open, showing the configuration for a new queue. The configuration fields are:

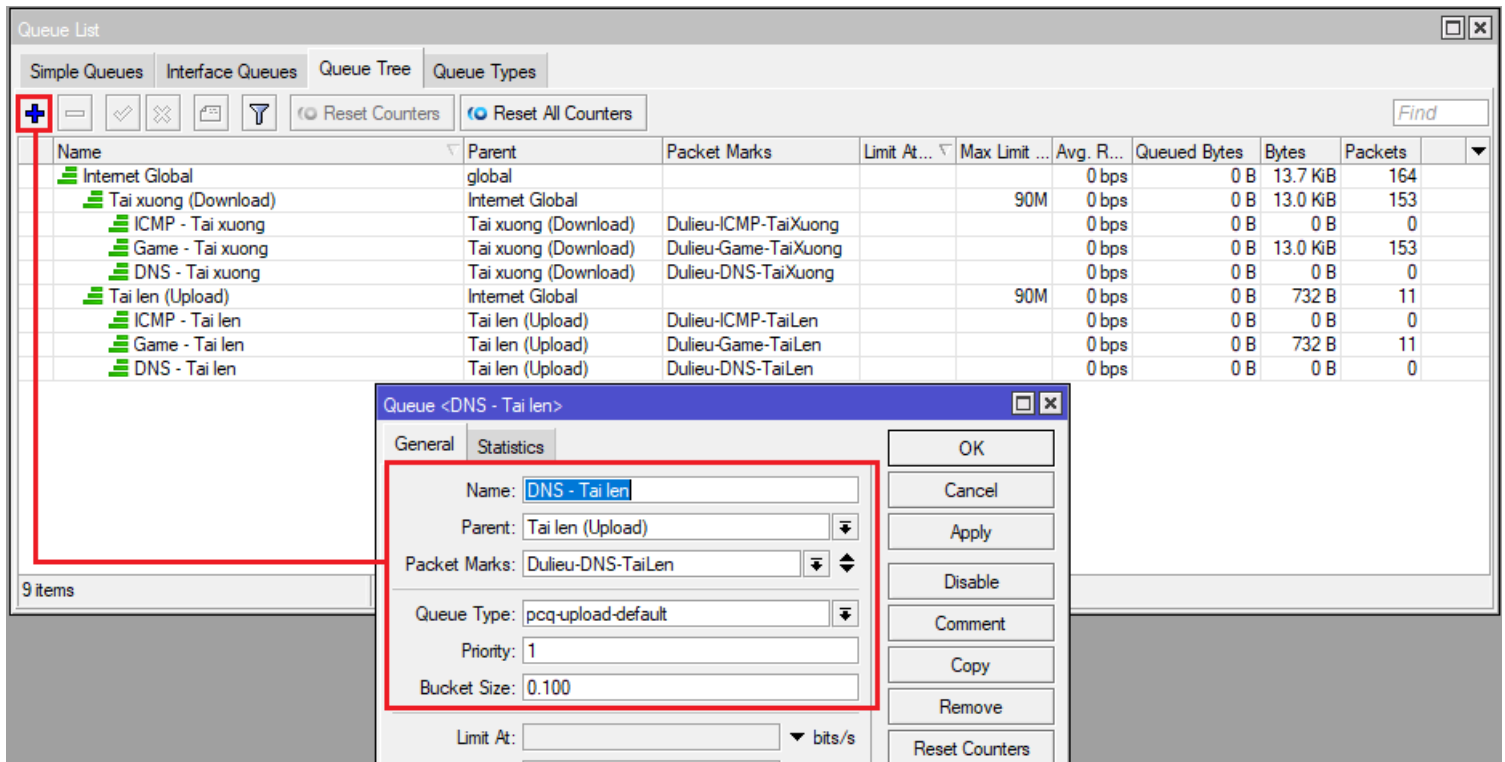
- Name: DNS - Tai xuong
- Parent: Tai xuong (Download)
- Packet Marks: Dulieu-DNS-TaiXuong
- Queue Type: pcq-download-default
- Priority: 1
- Bucket Size: 0.100

Name	Parent	Packet Marks	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				0 bps	0 B	13.5 KiB	161
Tai xuong (Download)	Internet Global			90M	0 bps	0 B	12.9 KiB	152
ICMP - Tai xuong	Tai xuong (Download)	Dulieu-ICMP-TaiXuong			0 bps	0 B	0 B	0
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong			0 bps	0 B	12.9 KiB	152
DNS - Tai xuong	Tai xuong (Download)	Dulieu-DNS-TaiXuong			0 bps	0 B	0 B	0
Tai len (Upload)	Internet Global			90M	0 bps	0 B	600 B	9
ICMP - Tai len	Tai len (Upload)	Dulieu-ICMP-TaiLen			0 bps	0 B	0 B	0
Game - Tai len	Tai len (Upload)	Dulieu-Game-TaiLen			0 bps	0 B	600 B	9

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Đưa lưu lượng DNS vào trên cây Tải lên.



! Lưu ý: Trong hình hướng, chúng ta mong muốn ưu tiên các lưu lượng mạng xã hội cụ thể, chẳng hạn ưu tiên lưu lượng mạng xã hội Facebook hơn, chúng ta cần gán thuộc tính mark-packet với tên gọi riêng. Sau đó, chúng ta tiến hành gán vào cây Tải lên và Cây Tải xuống với mức bằng thông tùy ý.

! Với ý tưởng hóa như sau, hệ thống có quy hoạch tổng thể hơn.



! Mặc dù chúng ta có thể gán MXH – Tai xuong và MXH – Tai len đồng đẳng với DNS – Tai len và DNS – Tai xuong.... Như ví dụ bên dưới này.

! Thế nhưng, chúng chưa quy hoạch tổng thể.

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

! Mẫu nháp -----

Trong tình huống này, chúng tôi gán tất cả lưu lượng mạng xã hội Facebook, Youtube và Tiktok vào chung thuộc tính Dulieu – MXH – Tailen và Dulieu – MXH – Taixuong.

- Đưa lưu lượng mạng xã hội vào cây Tải xuống

The screenshot shows the Mikrotik WinBox interface. The 'Queue List' window is open, displaying a tree view of queues. A red box highlights the '+ Add' button and the 'MXH - Tai xuong' queue. A dialog box titled 'Queue <MXH - Tai xuong>' is open, showing the configuration for this queue. The dialog has two tabs: 'General' and 'Statistics'. The 'General' tab is active, showing the following configuration:

- Name: MXH - Tai xuong
- Parent: Tai xuong (Download)
- Packet Marks: Dulieu-MXH-TaiXuong
- Queue Type: pqc-download-default
- Priority: 8
- Bucket Size: 0.100
- Limit At: (empty)
- Max Limit: 70M
- Burst Limit: (empty)

The 'Statistics' tab is also visible, showing various performance metrics. The 'Queue List' window shows a table of queues with columns: Name, Parent, Packet Marks, Limit At..., Max Limit..., Avg. R..., Queued Bytes, Bytes, and Packets.

Name	Parent	Packet Marks	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				0 bps	0 B	33.6 KiB	382
Tai xuong (Download)	Internet Global			90M	0 bps	0 B	25.0 KiB	271
MXH - Tai xuong	Tai xuong (Download)	Dulieu-MXH-TaiXuong		70M	0 bps	0 B	0 B	0
ICMP - Tai xuong	Tai xuong (Download)	Dulieu-ICMP-TaiXuong			0 bps	0 B	4.9 KiB	98
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong			0 bps	0 B	20.1 KiB	173
DNS - Tai xuong	Tai xuong (Download)	Dulieu-DNS-TaiXuong			0 bps	0 B	0 B	0
Tai len (Upload)					0 bps	0 B	8.6 KiB	111
ICMP - Tai len					0 bps	0 B	5.6 KiB	77
Game - Tai len					0 bps	0 B	3081 B	34
DNS - Tai len					0 bps	0 B	0 B	0

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Đưa lưu lượng mạng xã hội vào cây Tài lên.

The screenshot shows the Mikrotik Queue List window with a table of queues and a configuration dialog for the 'MXH - Tai len' queue. A red box highlights the '+' icon in the Queue List toolbar and the configuration dialog.

Name	Parent	Packet Marks	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets
Internet Global	global				0 bps	0 B	33.6 KiB	382
Tai xuong (Download)	Internet Global			90M	0 bps	0 B	25.0 KiB	271
MXH - Tai xuong	Tai xuong (Download)	Dulieu-MXH-TaiXuong		70M	0 bps	0 B	0 B	0
ICMP - Tai xuong	Tai xuong (Download)	Dulieu-ICMP-TaiXuong			0 bps	0 B	4.9 KiB	98
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong			0 bps	0 B	20.1 KiB	173
DNS - Tai xuong	Tai xuong (Download)	Dulieu-DNS-TaiXuong			0 bps	0 B	0 B	0
Tai len (Upload)	Internet Global			90M	0 bps	0 B	8.6 KiB	111
MXH - Tai len	Tai len (Upload)	Dulieu-MXH-TaiLen		70M	0 bps	0 B	0 B	0
ICMP - Tai len	Tai len (Upload)	Dulieu-ICMP-TaiLen			0 bps	0 B	5.6 KiB	77
Game - Tai len	Tai len (Upload)	Dulieu-Game-TaiLen			0 bps	0 B	3081 B	34
DNS - Tai len	Tai len (Upload)	Dulieu-DNS-TaiLen			0 bps	0 B	0 B	0

Queue <MXH - Tai len> configuration dialog:

- Name: MXH - Tai len
- Parent: Tai len (Upload)
- Packet Marks: Dulieu-MXH-TaiLen
- Queue Type: default-small
- Priority: 8
- Bucket Size: 0.100
- Limit At: [] bits/s
- Max Limit: 70M bits/s
- Burst Limit: [] bits/s

! Hủy mẫu nhập tại đây ----

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Xây dựng phần Tải xuống còn lại trên Cây tải xuống.

The screenshot shows the Mikrotik WinBox Queue List window. The 'Queue List' table is visible, and a dialog box for editing the 'Phan con lai - Tai xuong' queue is open. The dialog box has two tabs: 'General' and 'Statistics'. The 'General' tab is active, and the following fields are highlighted with red boxes:

- Name: Phan con lai - Tai xuong
- Parent: Tai xuong (Download)
- Queue Type: pcq-download-default
- Priority: 8
- Bucket Size: 0.100
- Limit At: (empty)
- Max Limit: 70M
- Burst Limit: (empty)

Name	Parent	Packet Marks	Priority	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets	PCQ Queues
Internet Global	global		8			4.3 kbps	0 B	466.6 MiB	469 513	
Tai xuong (Download)	Internet Global		8		90M	3.8 kbps	0 B	454.4 MiB	337 237	
Phan con lai - Tai xuong	Tai xuong (Download)		8		70M	0 bps	0 B	0 B	0	
ICMP - Tai xuong	Tai xuong (Download)	Dulieu-ICMP-TaiXuong	1			0 bps	0 B	44.9 KiB	597	
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong	1			3.8 kbps	0 B	263.0 KiB	1 270	2
DNS - Tai xuong	Tai xuong (Download)	Dulieu-DNS-TaiXuong	1			0 bps	0 B	0 B	0	
Tai len (Upload)	Internet Global		8		90M	544 bps	0 B	12.1 MiB	132 276	
ICMP - Tai len	Tai len (Upload)	Dulieu-ICMP-TaiLen	1			0 bps	0 B	44.3 KiB	513	
Game - Tai len	Tai len (Upload)	Dulieu-Game-TaiLen	1			544 bps	0 B	77.0 KiB	1 001	2
DNS - Tai len	Tai len (Upload)	Dulieu-DNS-TaiLen	1			0 bps	0 B	0 B	0	

- Xây dựng phần Tải lên còn lại trên cây Tải lên.

The screenshot shows the Mikrotik WinBox Queue List window. The 'Queue List' table is visible, and a dialog box for editing the 'Phan con lai - Tai len' queue is open. The dialog box has two tabs: 'General' and 'Statistics'. The 'General' tab is active, and the following fields are highlighted with red boxes:

- Name: Phan con lai - Tai len
- Parent: Tai len (Upload)
- Queue Type: pcq-upload-default
- Priority: 8
- Bucket Size: 0.100
- Limit At: (empty)
- Max Limit: 70M
- Burst Limit: (empty)

Name	Parent	Packet Marks	Priority	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets	PCQ Queues
Internet Global	global		8			5.1 kbps	0 B	466.6 MiB	469 581	
Tai xuong (Download)	Internet Global		8		90M	4.4 kbps	0 B	454.5 MiB	337 273	
Phan con lai - Tai xuong	Tai xuong (Download)		8		70M	0 bps	0 B	0 B	0	
ICMP - Tai xuong	Tai xuong (Download)	Dulieu-ICMP-TaiXuong	1			0 bps	0 B	44.9 KiB	597	
Game - Tai xuong	Tai xuong (Download)	Dulieu-Game-TaiXuong	1			4.4 kbps	0 B	278.0 KiB	1 306	2
DNS - Tai xuong	Tai xuong (Download)	Dulieu-DNS-TaiXuong	1			0 bps	0 B	0 B	0	
Tai len (Upload)	Internet Global		8		90M	728 bps	0 B	12.1 MiB	132 308	
Phan con lai - Tai len	Tai len (Upload)		8		70M	0 bps	0 B	0 B	0	
ICMP - Tai len	Tai len (Upload)	Dulieu-ICMP-TaiLen	1			0 bps	0 B	44.3 KiB	513	
Game - Tai len	Tai len (Upload)	Dulieu-Game-TaiLen	1			728 bps	0 B	79.1 KiB	1 033	2
DNS - Tai len	Tai len (Upload)	Dulieu-DNS-TaiLen	1			0 bps	0 B	0 B	0	

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Rồi ! Tiếp tục đưa các lưu lượng MXH – Tải xuống vào trên Phần còn lại – Tải xuống.

The screenshot shows the Mikrotik Queue List interface. A red box highlights the 'Add' (+) button in the top-left corner. Another red box highlights the configuration dialog for the queue 'MXH - Tải xuống'. The dialog shows the following settings:

- Name: MXH - Tải xuống
- Parent: Phan con lai - Tải xuống
- Packet Marks: Duleiu-MXH-TaiXuong
- Queue Type: pcq-download-default
- Priority: 8
- Bucket Size: 0.100
- Limit At: (empty)
- Max Limit: 30M
- Burst Limit: (empty)

Name	Parent	Packet Marks	Priority	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets	PCQ Queues
Internet Global	global		8			0 bps	0 B	466.6 MB	469 720	
Tai xuống (Download)	Internet Global		8		90M	0 bps	0 B	454.5 MB	337 343	
Phan con lai - Tai xuống	Tai xuống (Download)		8		70M	0 bps	0 B	0 B	0	
MXH - Tai xuống	Phan con lai - Tai xuống	Duleiu-MXH-TaiXuong	8		30M	0 bps	0 B	0 B	0	
ICMP - Tai xuống	Tai xuống (Download)	Duleiu-ICMP-TaiXuong	1			0 bps	0 B	45.4 KB	603	
Game - Tai xuống	Tai xuống (Download)	Duleiu-Game-TaiXuong	1			0 bps	0 B	307.5 KB	1 370	
DNS - Tai xuống	Tai xuống (Download)	Duleiu-DNS-TaiXuong	1			0 bps	0 B	0 B	0	
Tai lên (Upload)	Internet Global		8		90M	0 bps	0 B	12.1 MB	132 377	
Phan con lai - Tai lên	Tai lên (Upload)		8		70M	0 bps	0 B	0 B	0	
ICMP - Tai lên	Phan con lai - Tai lên		1			0 bps	0 B	45.2 KB	524	
Game - Tai lên	Phan con lai - Tai lên		1			0 bps	0 B	83.0 KB	1 091	
DNS - Tai lên	Phan con lai - Tai lên		1			0 bps	0 B	0 B	0	

- Lại tiếp tục đưa lưu lượng MXH – Tải lên vào trên Phần còn lại – Tải lên

The screenshot shows the Mikrotik Queue List interface. A red box highlights the 'Add' (+) button in the top-left corner. Another red box highlights the configuration dialog for the queue 'MXH - Tải lên'. The dialog shows the following settings:

- Name: MXH - Tải lên
- Parent: Phan con lai - Tai len
- Packet Marks: Duleiu-MXH-TaiLen
- Queue Type: pcq-upload-default
- Priority: 8
- Bucket Size: 0.100
- Limit At: (empty)
- Max Limit: 30M
- Burst Limit: (empty)

Name	Parent	Packet Marks	Priority	Limit At...	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets	PCQ Queues
Internet Global	global		8			0 bps	0 B	466.6 MB	469 811	
Tai xuống (Download)	Internet Global		8		90M	0 bps	0 B	454.5 MB	337 408	
Phan con lai - Tai xuống	Tai xuống (Download)		8		70M	0 bps	0 B	7.3 KB	37	
MXH - Tai xuống	Phan con lai - Tai xuống	Duleiu-MXH-TaiXuong	8		30M	0 bps	0 B	7.3 KB	37	
ICMP - Tai xuống	Tai xuống (Download)	Duleiu-ICMP-TaiXuong	1			0 bps	0 B	45.4 KB	603	
Game - Tai xuống	Tai xuống (Download)	Duleiu-Game-TaiXuong	1			0 bps	0 B	319.0 KB	1 398	
DNS - Tai xuống	Tai xuống (Download)	Duleiu-DNS-TaiXuong	1			0 bps	0 B	0 B	0	
Tai lên (Upload)	Internet Global		8		90M	0 bps	0 B	12.1 MB	132 403	
Phan con lai - Tai lên	Tai lên (Upload)		8		70M	0 bps	0 B	0 B	0	
MXH - Tai lên	Phan con lai - Tai lên	Duleiu-MXH-TaiLen	8		30M	0 bps	0 B	45.2 KB	524	
ICMP - Tai lên	Phan con lai - Tai lên		1			0 bps	0 B	84.8 KB	1 117	
Game - Tai lên	Phan con lai - Tai lên		1			0 bps	0 B	0 B	0	
DNS - Tai lên	Phan con lai - Tai lên		1			0 bps	0 B	0 B	0	

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Đưa lưu lượng chung chung vào trên cây Phần còn lại – Tải xuống

The screenshot shows the Mikrotik Queue List interface. A dialog box titled 'Queue <ChungChung - Tai xuong>' is open, showing the configuration for a download queue. The configuration is as follows:

Field	Value
Name	ChungChung - Tai xuong
Parent	Phan con lai - Tai xuong
Packet Marks	Dulieu-ChungChung-TaiXuong
Queue Type	pcq-download-default
Priority	8
Bucket Size	0.100
Limit At	
Max Limit	40M
Burst Limit	

- Đưa lưu lượng Chung Chung vào trên Phần còn lại – Tải lên

The screenshot shows the Mikrotik Queue List interface. A dialog box titled 'Queue <ChungChung - Tai len>' is open, showing the configuration for an upload queue. The configuration is as follows:

Field	Value
Name	ChungChung - Tai len
Parent	Phan con lai - Tai len
Packet Marks	Dulieu-ChungChung-TaiLen
Queue Type	pcq-upload-default
Priority	8
Bucket Size	0.100
Limit At	
Max Limit	40M
Burst Limit	

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

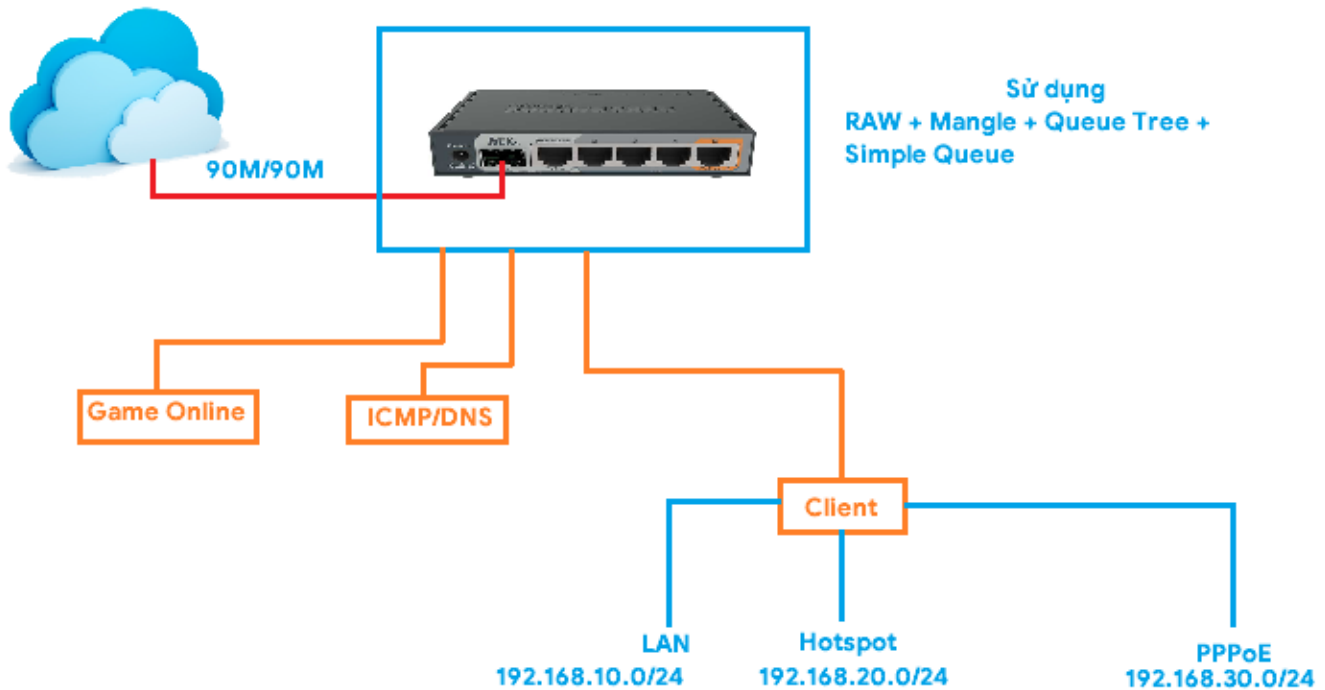
Và đây là phần lệnh cho Thẻ Queue Tree

```
/queue tree
add name="Internet Global" parent=global queue=default
add max-limit=90M name="Tai xuong (Download)" parent="Internet Global" queue=pcq-
download-default
add max-limit=90M name="Tai len (Upload)" parent="Internet Global" queue=pcq-upload-
default
add name="Game - Tai xuong" packet-mark=Dulieu-Game-TaiXuong parent="Tai xuong
(Download)" priority=1 queue=pcq-download-default
add name="Game - Tai len" packet-mark=Dulieu-Game-TaiLen parent="Tai len (Upload)"
priority=1 queue=pcq-upload-default
add name="ICMP - Tai xuong" packet-mark=Dulieu-ICMP-TaiXuong parent="Tai xuong
(Download)" priority=1 queue=pcq-download-default
add name="ICMP - Tai len" packet-mark=Dulieu-ICMP-TaiLen parent="Tai len (Upload)"
priority=1 queue=pcq-upload-default
add name="DNS - Tai xuong" packet-mark=Dulieu-DNS-TaiXuong parent="Tai xuong
(Download)" priority=1 queue=pcq-download-default
add name="DNS - Tai len" packet-mark=Dulieu-DNS-TaiLen parent="Tai len (Upload)"
priority=1 queue=pcq-upload-default
add max-limit=70M name="Phan con lai - Tai xuong" parent="Tai xuong (Download)"
queue=pcq-download-default
add max-limit=70M name="Phan con lai - Tai len" parent="Tai len (Upload)" queue=pcq-
upload-default
add max-limit=30M name="MXH - Tai xuong" packet-mark=Dulieu-MXH-TaiXuong
parent="Phan con lai - Tai xuong" queue=pcq-download-default
add max-limit=30M name="MXH - Tai len" packet-mark=Dulieu-MXH-TaiLen parent="Phan
con lai - Tai len" queue=pcq-upload-default
add max-limit=40M name="ChungChung - Tai xuong" packet-mark=Dulieu-ChungChung-
TaiXuong parent="Phan con lai - Tai xuong" queue=pcq-download-default
add max-limit=40M name="ChungChung - Tai len" packet-mark=Dulieu-ChungChung-TaiLen
parent="Phan con lai - Tai len" queue=pcq-upload-default
...
```

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPoE

4. Đánh dấu lưu lượng xuất phát trên nhiều mạng: LAN, Hotspot, PPPoE.



Tại Menu Queue – Thẻ Simple Queues.

- Khởi tạo bằng thông tổng cho tất cả các mạng.

#	Name	Target	Upload Max Limit	Download Max Limit	Packet Marks	Total Max Limit (bi...
0	Ket Noi Internet	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	90M	90M		

Simple Queue <Ket Noi Internet>

General

Name: Ket Noi Internet

Target: 192.168.10.0/24
192.168.20.0/24
192.168.30.0/24

Max Limit: 90M 90M bits/s

Target Upload: 90M bits/s

Target Download: 90M bits/s

Queue Type: default

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Đưa lưu lượng Game Online vào trên cây Kết nối Internet

The screenshot shows the Mikrotik WinBox Queue List interface. The 'Queue List' window is open, displaying a table of queues. The 'Game Online' queue is selected. The configuration for this queue is shown in the 'Simple Queue <Game Online>' dialog box. The 'Name' is 'Game Online', and the 'Target' is '192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24'. The 'Packet Marks' are 'Dulieu-Game-TaiXuong' and 'Dulieu-Game-TaiLen'. The 'Limit At' is 'unlimited', and the 'Priority' is '1'. The 'Queue Type' is 'pcq-upload-default' and 'pcq-download-default'. The 'Parent' is 'Ket Noi Internet'.

#	Name	Target	Upload Max Limit	Download Max Limit	Packet Marks	Total Max Limit (bi...
0	Ket Noi Internet	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	90M	90M		
1	Game Online	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	unlimited	unlimited	Dulieu-Game-TaiX...	

- Đưa lưu lượng ICMP và DNS vào cây Kết nối Internet.

The screenshot shows the Mikrotik WinBox Queue List interface. The 'Queue List' window is open, displaying a table of queues. The 'ICMP' queue is selected. The configuration for this queue is shown in the 'Simple Queue <ICMP>' dialog box. The 'Name' is 'ICMP', and the 'Target' is '192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24'. The 'Packet Marks' are 'Dulieu-ICMP-TaiXuong' and 'Dulieu-ICMP-TaiLen'. The 'Limit At' is 'unlimited', and the 'Priority' is '1'. The 'Queue Type' is 'pcq-upload-default' and 'pcq-download-default'. The 'Parent' is 'Ket Noi Internet'.

#	Name	Target	Upload Max Limit	Download Max Limit	Packet Marks	Total Max Limit ...
0	Ket Noi Internet	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	90M	90M		
1	Game Online	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	unlimited	unlimited	Dulieu-Game-TaiXuong, Dulieu-Game-TaiLen	
2	ICMP	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	unlimited	unlimited	Dulieu-ICMP-TaiXuong, Dulieu-ICMP-TaiLen	

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Khởi tạo cây Chung Chung vào trên cây Internet.

The screenshot shows the Mikrotik WinBox Queue List interface. The 'Simple Queues' tab is active, displaying a list of queues. The '4. ChungChung' queue is selected, and its configuration is shown in the 'Simple Queue <4. ChungChung>' dialog box. The configuration includes:

- Name:** 4. ChungChung
- Target:** 192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24
- Max Limit:** 70M
- Packet Marks:** Dulieu-ChungChung-TaiLen, Dulieu-ChungChung-TaiXuong, Dulieu-MXH-TaiXuong, Dulieu-MXH-TaiLen
- Target Upload:** unlimited
- Target Download:** unlimited
- Priority:** 8
- Bucket Size:** 0.100
- Queue Type:** default
- Parent:** Ket Noi Internet

The screenshot shows the Mikrotik WinBox Queue List interface. The 'Simple Queues' tab is active, displaying a list of queues. The 'DNS' queue is selected, and its configuration is shown in the 'Simple Queue <DNS>' dialog box. The configuration includes:

- Name:** DNS
- Target:** 192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24
- Max Limit:** unlimited
- Packet Marks:** Dulieu-DNS-TaiXuong, Dulieu-DNS-TaiLen
- Target Upload:** unlimited
- Target Download:** unlimited
- Priority:** 1
- Bucket Size:** 0.100
- Queue Type:** pcq-upload-default
- Parent:** Ket Noi Internet

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPOE

- Đưa các lớp mạng LAN vào trên cây ChungChung.

The screenshot shows the Mikrotik WinBox Queue List interface. The 'Queue List' window is open, displaying a table of queues. The 'LAN' queue is selected, and its configuration is shown in the 'Simple Queue <LAN>' dialog box. The configuration is as follows:

Field	Value
Name	LAN
Target	192.168.10.0/24
Max Limit	10M
Target Upload	10M
Target Download	10M
Limit At	unlimited
Priority	8
Bucket Size	0.100
Queue Type	pcq-upload-default
Parent	4. ChungChung

- Đưa lớp mạng Hotspot vào trên cây ChungChung

The screenshot shows the Mikrotik WinBox Queue List interface. The 'Queue List' window is open, displaying a table of queues. The 'Hotspot' queue is selected, and its configuration is shown in the 'Simple Queue <Hotspot>' dialog box. The configuration is as follows:

Field	Value
Name	Hotspot
Target	192.168.20.0/24
Max Limit	unlimited
Target Upload	unlimited
Target Download	unlimited
Limit At	unlimited
Priority	8
Bucket Size	0.100
Queue Type	default
Parent	4. ChungChung

! Lưu ý: Trong trường hợp sử dụng giới hạn băng thông cho mỗi người dùng Hotspot/PPPoE riêng, chúng tôi không cần gán băng thông cố định trong thẻ Max Limit (giá trị Max Limit sẽ gán là Unlimited), đồng thời mục Queue Type=Default.

XÂY DỰNG QOS MẠNG NỘI BỘ

LAN – HOTSPOT – PPPoE

- Đưa lớp mạng PPPoE vào trên cây ChungChung.

The screenshot shows the Mikrotik WinBox interface. At the top, the 'Queue List' window displays a table of queues. The 'PPPoE' queue is highlighted in blue. Below this, two configuration windows for 'Simple Queue <PPPoE>' are shown. The left window is the 'General' tab, and the right window is the 'Advanced' tab. Red boxes highlight specific fields: 'Name: PPPoE', 'Target: 192.168.30.0/24', 'Max Limit: unlimited', 'Queue Type: default', and 'Parent: 4. ChungChung'.

#	Name	Target	Upload Max Limit	Download Max Limit	Packet Marks	Total Max Limit (bi...
0	Ket Noi Internet	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	90M	90M		
2	1. ICMP	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	unlimited	unlimited	Duleiu-ICMP-TaiX...	
3	2. DNS	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	unlimited	unlimited	Duleiu-DNS-TaiX...	
1	3. Game Online	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	unlimited	unlimited	Duleiu-Game-TaiX...	
4	4. ChungChung	192.168.10.0/24, 192.168.20.0/24, 192.168.30.0/24	70M	70M	Duleiu-ChungChu...	
6	Hotspot	192.168.20.0/24	unlimited	unlimited		
5	LAN	192.168.10.0/24	10M	10M		
7	PPPoE	192.168.30.0/24	unlimited	unlimited		

! Bởi vì dịch vụ Hotspot và PPPoE có phương pháp gán băng thông và quản lí hàng đợi đặc dụng, vì thế việc thiết lập các phương pháp này để giá trị Queue Type = Default để các dịch vụ này hoạt động trên nguyên tắc mặc định của chúng.