



# Advanced Hotspot - QOS -

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[www.mikrotik.co.id](http://www.mikrotik.co.id)

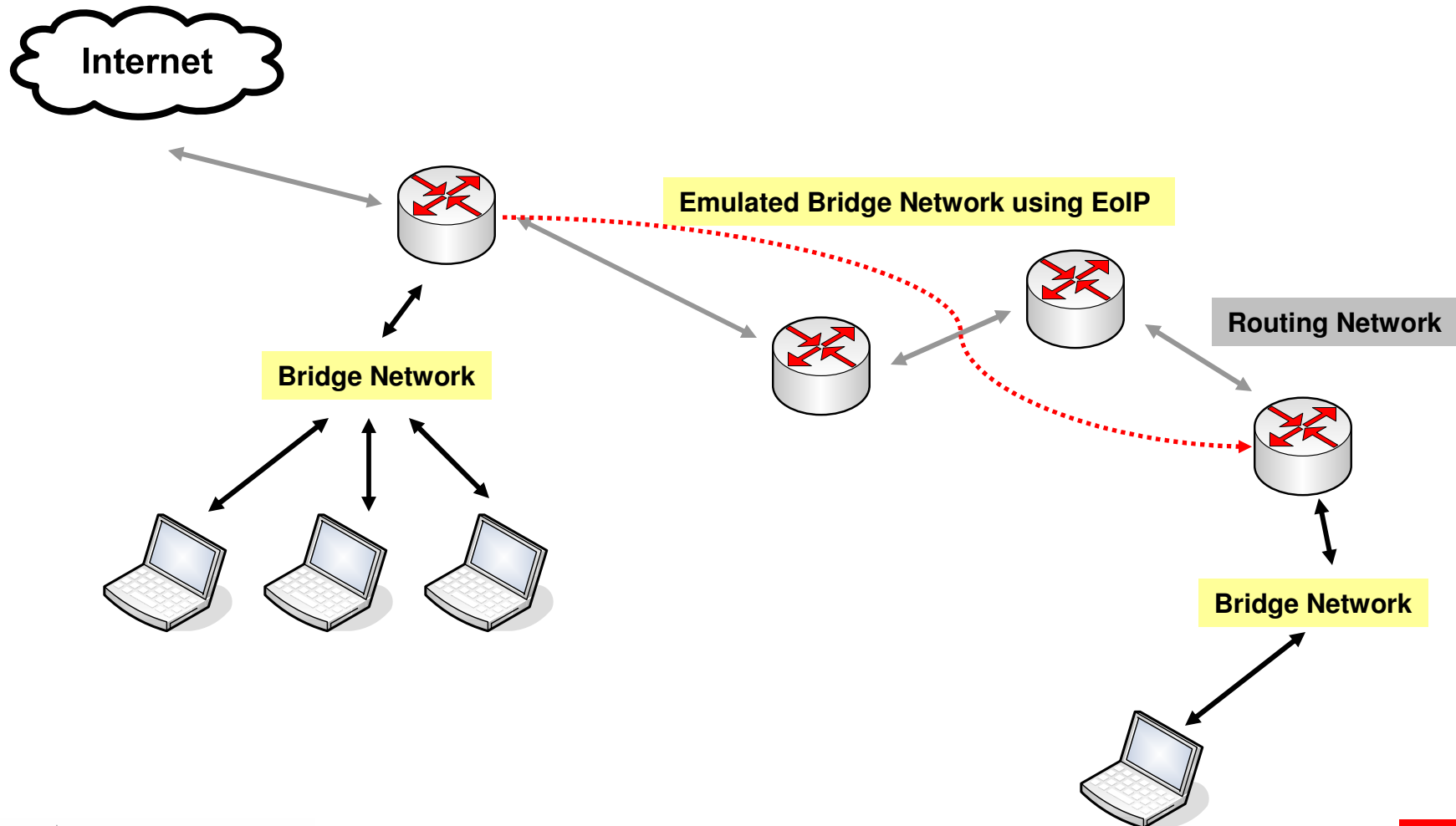
# Introduction

- Novan Chris - [novan@mikrotik.co.id](mailto:novan@mikrotik.co.id)
- Company: Citraweb Nusa Infomedia
  - Mikrotik Distributor (2002), Training Partner (2005)
    - [www.mikrotik.co.id](http://www.mikrotik.co.id)
  - Wireless ISP
    - [www.citra.net.id](http://www.citra.net.id)
  - Web Developer
    - [www.citra.web.id](http://www.citra.web.id)
- Mikrotik Support and Trainer
- IT Supervisor – Honorary Member of Sat-81 Kopassus

# HOTSPOT

- **Plug-n-Play** – Computer network yang memungkinkan penggunaan null configuration pada client.
- **Authentication** – System autentikasi yang bisa menjaga network tetap terkontrol walaupun bersifat public access.
- **Bridge Network** – hanya berjalan di bridge network dan bisa juga di routed network jika menggunakan EoIP.
- **Limitation** – menjaga monopoli user.
- **Quality OF Service** – traffic tetap dapat terkontrol untuk menjaga kecepatan akses client tetap rasional.
- **Bypass** – resource jaringan bisa diberikan tanpa autentikasi.

# Hotspot Network



# Hotspot Instalation

- **[admin@MikroTik] > /ip hotspot setup**
- **Select interface to run HotSpot on**
  - hotspot interface: ether3
- **Set HotSpot address for interface**
  - local address of network: 10.5.51.1/24
  - masquerade network: yes
- **Set pool for HotSpot addresses**
  - address pool of network: 10.5.51.2-10.5.51.254
- **Select hotspot SSL certificate**
  - select certificate: none
- **Select SMTP server**
  - ip address of smtp server: 0.0.0.0
- **Setup DNS configuration**
  - dns servers: 203.84.155.188,2.2.2.2
- **DNS name of local hotspot server**
  - dns name:
- **name of local hotspot user**
  - Username: admin
  - Password:

# Hotspot QOS

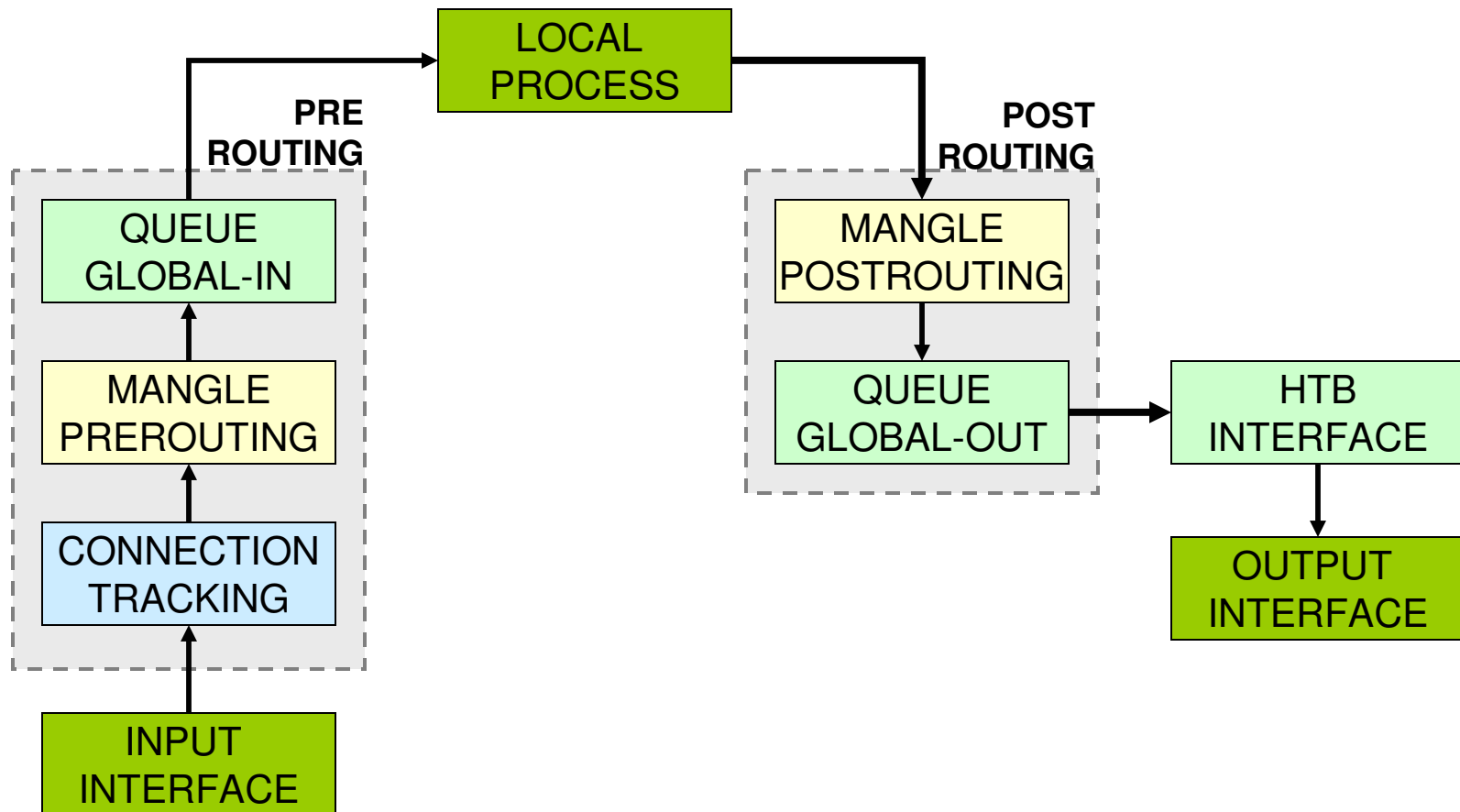


- Limitasi Kecepatan akses Hotspot dibagi menjadi 2 metode:
  - **Built-in limiter** – menggunakan parameter rate-limit di **server-profile** untuk melimit total traffic dari hotspot network sedangkan jika ingin limit per user bisa menggunakan rate-limit di **user-profile**.
  - Menggunakan *custom limitation* yang memanfaatkan parameter **Incoming-packet-mark** dan **outgoing-packet-mark** pada user-profile.

# Hotspot QOS

- Built-in Limitation dilakukan secara otomatis dan mudah tetapi tidak memungkinkan melakukan implementasi HTB.
- Dengan menggunakan Custom Limitation anda bisa melakukan implementasi HTB dan melakukan limitasi berdasarkan kriteria koneksi yang lebih beragam.

# Hotspot Packet Flow



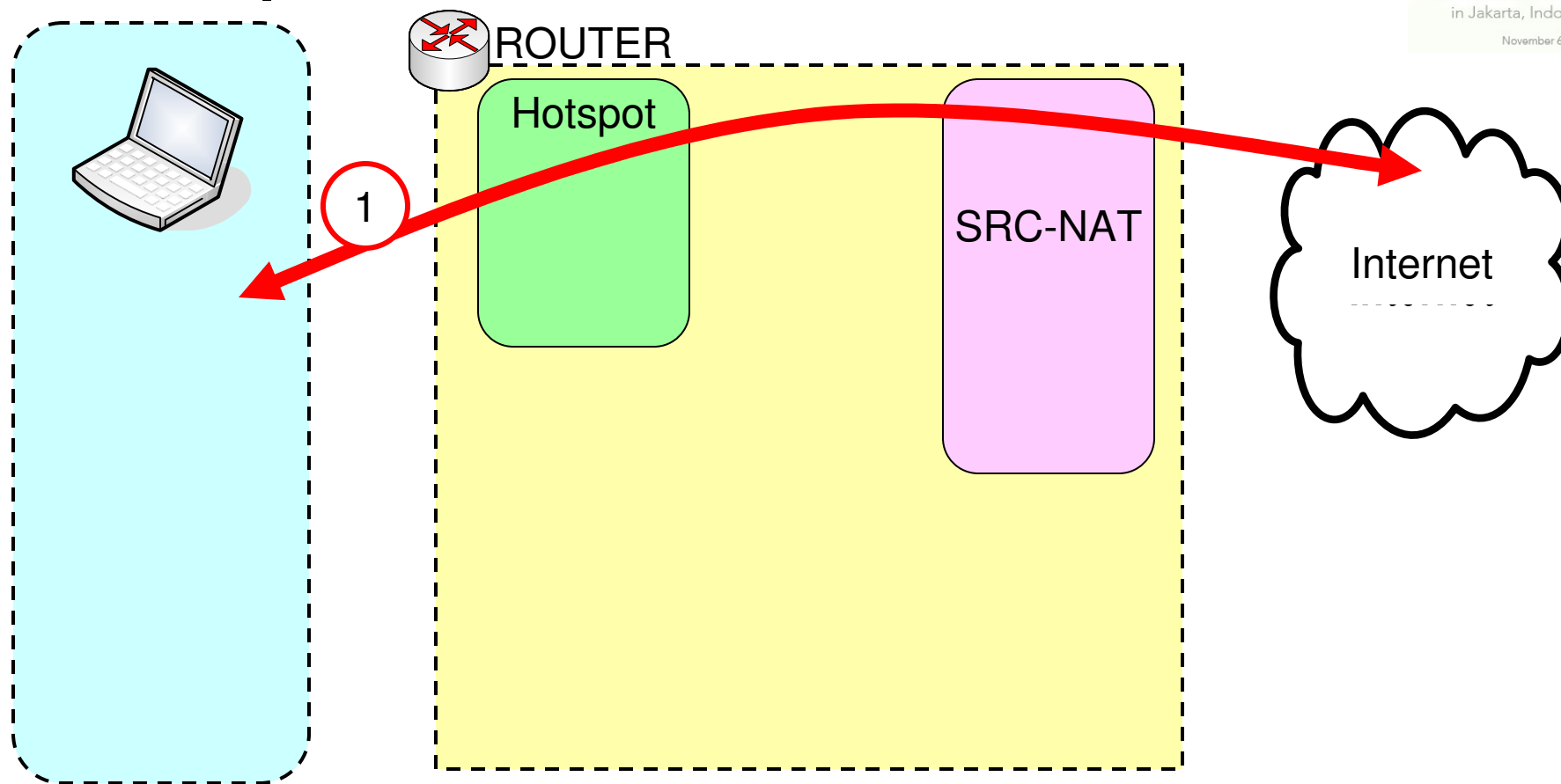


# Hotspot – The Traffic



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# Hotspot Built-in Limitation

Hotspot Server Profile <hsprof1>

General Login RADIUS

Name: hsprof1

Hotspot Address: 10.5.50.1

DNS Name:

HTML Directory: hotspot

Rate Limit (rx/bx): 1m/1m

HTTP Proxy:

HTTP Proxy Port: 0

SMTP Server:

- Parameter **Rate-Limit** pada server profile akan membatasi total traffic dari hotspot network.
- Traffic Bypass juga terlimit.

Queue List

Simple Queues Interface Queues Queue Tree Queue Types

+ - ✓ ✗ [icon] [icon] Reset Counters oo Reset All Counters Find

| # |   | Name           | Target Ad... | Rx Max Limit | Tx Max Limit | Rx    | Tx         |  |
|---|---|----------------|--------------|--------------|--------------|-------|------------|--|
| 0 | D | hs-<hotspot 1> |              | 1M           | 1M           | 0 bps | 134.1 kbps |  |

# Hotspot Built-in Limitation

Hotspot User Profile <uprof-group1>

General | Advertise | Scripts

Name:

Address Pool:

Session Timeout:

Idle Timeout:

Keepalive Timeout:

Status Autorefresh:

Shared Users:

Rate Limit (rx/tx):

- Parameter **Rate-Limit** pada user profile akan membatasi traffic dari hotspot client dalam satu group.
- HTB tidak dapat diimplementasikan.

Queue List

Simple Queues | Interface Queues | Queue Tree | Queue Types

| # |   | Name                                                                                                | Target Ad... | Rx Max Limit | Tx Max Limit | Rx    | Tx         |  |
|---|---|-----------------------------------------------------------------------------------------------------|--------------|--------------|--------------|-------|------------|--|
| 0 | D |  <hotspot-user1> | 10.5.50.253  | 128k         | 128k         | 0 bps | 120.4 kbps |  |
| 1 | D |  hs-<hotspot 1>  |              | 1M           | 1M           | 0 bps | 0 bps      |  |

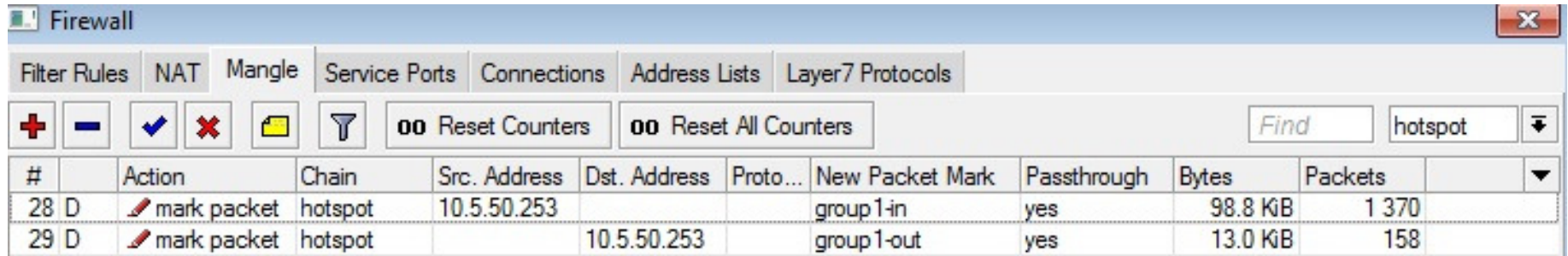
# Custom Limitation - Profile

The screenshot shows the 'Hotspot User Profile <uprof-group1>' configuration window. It has three tabs: 'General', 'Advertise', and 'Scripts'. The 'General' tab is active. The configuration includes fields for Name (uprof-group1), Address Pool (hs-pool-6), Session Timeout, Idle Timeout (none), Keepalive Timeout (00:02:00), Status Autorefresh (00:01:00), Shared Users, Rate Limit (px/bx), Address List, Incoming Filter, Outgoing Filter, Incoming Packet Mark (group1-in), Outgoing Packet Mark (group1-out), Open Status Page (always), and a checked 'Transparent Proxy' checkbox. The 'Incoming Packet Mark' and 'Outgoing Packet Mark' fields are highlighted with a red rectangle.

| Field                | Value                               |
|----------------------|-------------------------------------|
| Name                 | uprof-group1                        |
| Address Pool         | hs-pool-6                           |
| Session Timeout      |                                     |
| Idle Timeout         | none                                |
| Keepalive Timeout    | 00:02:00                            |
| Status Autorefresh   | 00:01:00                            |
| Shared Users         |                                     |
| Rate Limit (px/bx)   |                                     |
| Address List         |                                     |
| Incoming Filter      |                                     |
| Outgoing Filter      |                                     |
| Incoming Packet Mark | group1-in                           |
| Outgoing Packet Mark | group1-out                          |
| Open Status Page     | always                              |
| Transparent Proxy    | <input checked="" type="checkbox"/> |

- Parameter Incoming-packet-mark dan Outgoing-packet-mark didefinisikan untuk melakukan penandaan (marking) traffic dari user di dalam group tersebut.
- Incoming-packet-mark melakukan marking traffic **upload** dan Outgoing-packet-mark melakukan marking traffic **download**.

# Custom Limitation - Mangle



The screenshot shows the Mikrotik WinBox Firewall Mangle configuration window. It displays two rules, 28 and 29, both configured for dynamic packet marking in the 'hotspot' chain. Rule 28 marks incoming traffic from 10.5.50.253 as 'group1-in', and Rule 29 marks outgoing traffic to 10.5.50.253 as 'group1-out'. Both rules have a 'Passthrough' of 'yes' and show traffic statistics.

| #    | Action      | Chain   | Src. Address | Dst. Address | Proto... | New Packet Mark | Passthrough | Bytes    | Packets |
|------|-------------|---------|--------------|--------------|----------|-----------------|-------------|----------|---------|
| 28 D | mark packet | hotspot | 10.5.50.253  |              |          | group1-in       | yes         | 98.8 KiB | 1 370   |
| 29 D | mark packet | hotspot |              | 10.5.50.253  |          | group1-out      | yes         | 13.0 KiB | 158     |

- Firewall mangle akan secara otomatis dan dinamis melakukan marking packet traffic dari client yang masuk di dalam group (profile).
- *Dynamic Marking* dilakukan di chain **Hotspot**.

# Custom Limitation - Mangle



- Rule **Jump** dari Built-in Chain ke chain *hotspot* diperlukan supaya traffic dari user dapat dibaca di firewall.
  - /ip firewall mangle add chain=**prerouting** **action=jump** jump-target=**hotspot**
  - /ip firewall mangle add chain=**postrouting** **action=jump** jump-target=**hotspot**

# Custom Limitation - Mangle



- ASUMSI : Network yang digunakan adalah network **NAT**.
- **Mark-Connection** harus dibuat berdasarkan mark packet dynamic dari profile atau dari **chain hotspot**.
  - /ip firewall mangle add chain=**prerouting** action=**mark-connection** new-connection-mark=**conn-group1** passthrough=yes **packet-mark=group1-in**
- Selanjutnya **Mark-Packet** bisa dibuat supaya bisa diimplementasikan atau dilimit traffiknya.
  - /ip firewall mangle add chain=**prerouting** action=mark-packet new-packet-mark=**packet-group1** passthrough=no **connection-mark=conn-group1**
  - /ip firewall mangle add chain=**postrouting** action=mark-packet new-packet-mark=**packet-group1** passthrough=no **connection-mark=conn-group1**
- Setelah mark packet dari traffic **group1** sudah dibuat maka limitasi bandwidth bisa dibuat di Queue.

# Custom Limitation - Queue

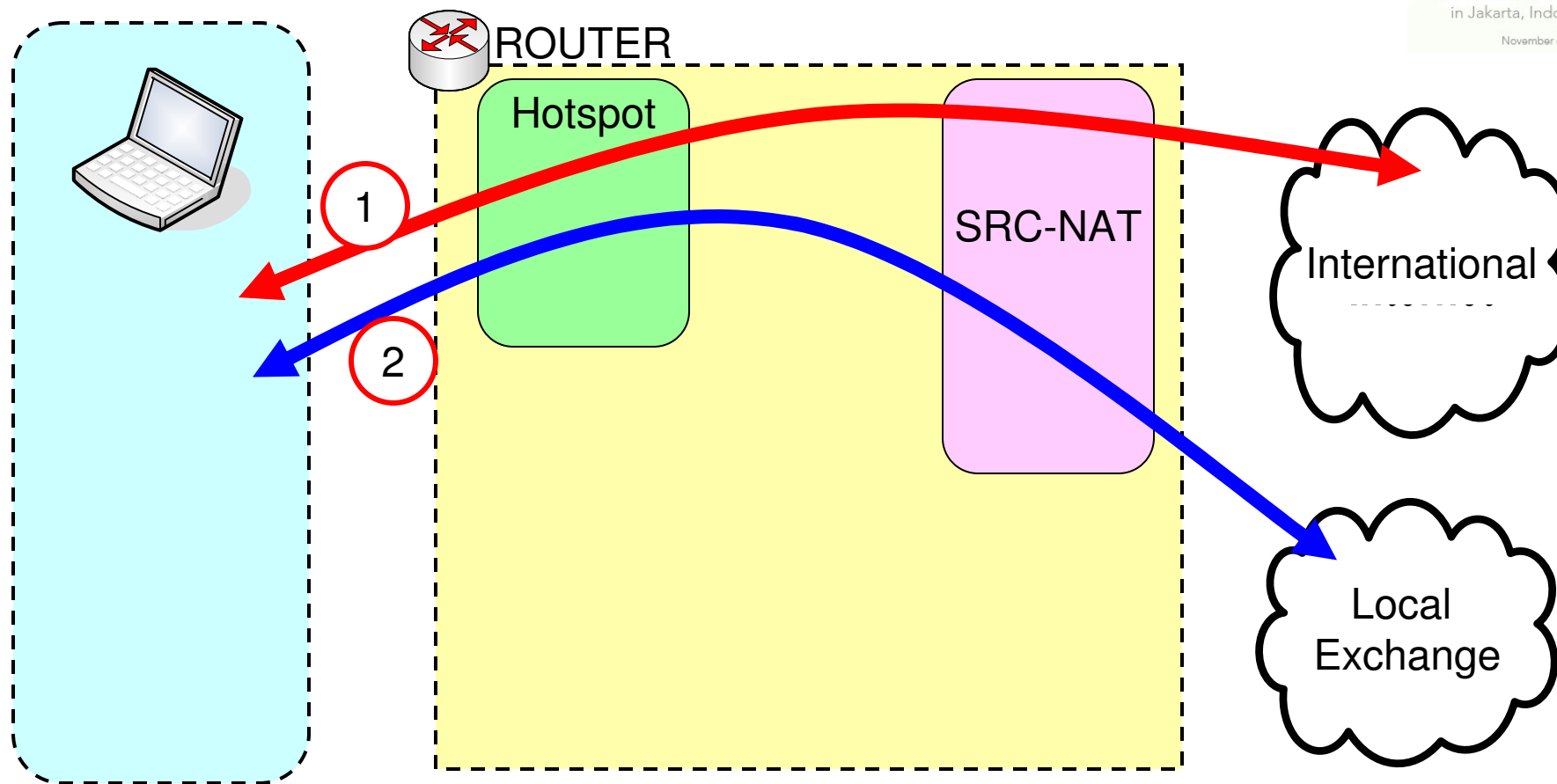
- `/queue tree add name="0-Hotspot1-total-Upload" parent=[interface public/global interface] packet-mark="" max-limit=2M`
- `/queue tree add name="0-Hotspot1-total-Download" parent=[interface hotspot] packet-mark="" max-limit=2M`
- `/queue tree add name="Group1-total-Download" parent=0-Hotspot1-total-Download packet-mark=packet-group1 limit-at=1M max-limit=2M`
- `/queue tree add name="Group1-total-Upload" parent=0-Hotspot1-total-Upload packet-mark=packet-group1 limit-at=1M max-limit=2M`



# Custom Limitation - Queue

| Queue List                                                                                                                                                                                                                                                               |                          |                          |               |                  |               |            |              |           |         |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|---------------|------------------|---------------|------------|--------------|-----------|---------|---|
| <div> <div>Simple Queues</div> <div>Interface Queues</div> <div>Queue Tree</div> <div>Queue Types</div> </div> <div> <div>+</div> <div>-</div> <div>✓</div> <div>✗</div> <div>⌵</div> <div>⌵ Reset Counters</div> <div>∞ Reset All Counters</div> <div>Find</div> </div> |                          |                          |               |                  |               |            |              |           |         |   |
|                                                                                                                                                                                                                                                                          | Name                     | Parent                   | Packet Marks  | Limit At (bit... | Max Limit ... | Avg. R...  | Queued Bytes | Bytes     | Packets | ▼ |
|                                                                                                                                                                                                                                                                          | 0-Hotspot1total-Download | wlan3                    |               |                  | 2M            | 271.7 k... | 0 B          | 136.5 ... | 146 079 |   |
|                                                                                                                                                                                                                                                                          | Group1total-Download     | 0-Hotspot1total-Download | packet-group1 | 1M               | 2M            | 271.7 k... | 0 B          | 13.3 MiB  | 10 290  |   |
|                                                                                                                                                                                                                                                                          | 0-Hotspot1total-Upload   | global-in                |               |                  | 2M            | 3.6 kbps   | 0 B          | 26.8 MiB  | 96 482  |   |
|                                                                                                                                                                                                                                                                          | Group1total-Upload       | 0-Hotspot1total-Upload   | packet-group1 | 1M               | 2M            | 3.6 kbps   | 0 B          | 454.5 ... | 5 899   |   |

# Hotspot – Based on Destination



# Hotspot – Based on Destination

- Untuk membedakan traffic IIX dan Internasional kita gunakan Address-List Nice.
  - /ip firewall mangle add chain=**prerouting** action=mark-connection new-connection-mark=**conn-group1-iix** passthrough=yes dst-address-list=**nice** packet-mark=group1-in
  - /ip firewall mangle add chain=**prerouting** action=mark-packet new-packet-mark=**packet-group1-iix** passthrough=no connection-mark=**conn-group1-iix**
  - /ip firewall mangle add chain=**prerouting** action=mark-connection new-connection-mark=**conn-group1-int** passthrough=yes dst-address-list=**!nice** packet-mark=group1-in
  - /ip firewall mangle add chain=**prerouting** action=mark-packet new-packet-mark=**packet-group1-int** passthrough=no connection-mark=**conn-group1-int**
  - /ip firewall mangle add chain=**postrouting** action=mark-packet new-packet-mark=**packet-group1-iix** passthrough=no connection-mark=**conn-group1-iix**
  - /ip firewall mangle add chain=**postrouting** action=mark-packet new-packet-mark=**packet-group1-int** passthrough=no connection-mark=**conn-group1-int**

# Hotspot – Based on Destination



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| Firewall                                                                                                                                                                                             |   |                   |             |              |              |                   |             |                 |            |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------|-------------|--------------|--------------|-------------------|-------------|-----------------|------------|---------|
| <div> <div>Filter Rules</div> <div>NAT</div> <div>Mangle</div> <div>Service Ports</div> <div>Connections</div> <div>Address Lists</div> <div>Layer7 Protocols</div> </div>                           |   |                   |             |              |              |                   |             |                 |            |         |
| <div> <div>+</div> <div>-</div> <div>✓</div> <div>✗</div> <div>📁</div> <div>🔍</div> <div>00 Reset Counters</div> <div>00 Reset All Counters</div> <div>Find</div> <div>all</div> <div>▼</div> </div> |   |                   |             |              |              |                   |             |                 |            |         |
| #                                                                                                                                                                                                    |   | Action            | Chain       | Src. Address | Dst. Address | New Packet Mark   | Passthrough | New Connecti... | Bytes      | Packets |
| 0                                                                                                                                                                                                    | D | ✍ mark packet     | hotspot     | 10.5.50.253  |              | group1-in         | yes         |                 | 7.1 MiB    | 23 874  |
| 1                                                                                                                                                                                                    | D | ✍ mark packet     | hotspot     |              | 10.5.50.253  | group1-out        | yes         |                 | 20.9 MiB   | 22 654  |
| 2                                                                                                                                                                                                    |   | 🔗 jump            | prerouting  |              |              |                   |             |                 | 23.9 MiB   | 40 512  |
| 3                                                                                                                                                                                                    |   | 🔗 mark connection | prerouting  |              |              |                   |             | conn-group1-ix  | 1569.3 KiB | 2 103   |
| 4                                                                                                                                                                                                    |   | ✍ mark packet     | prerouting  |              |              | packet-group1-ix  | no          |                 | 2841.2 KiB | 3 111   |
| 5                                                                                                                                                                                                    |   | 🔗 mark connection | prerouting  |              |              |                   |             | conn-group1-int | 2829.1 KiB | 11 690  |
| 6                                                                                                                                                                                                    |   | ✍ mark packet     | prerouting  |              |              | packet-group1-int | no          |                 | 3944.3 KiB | 12 966  |
| 7                                                                                                                                                                                                    |   | 🔗 jump            | postrouting |              |              |                   |             |                 | 27.7 MiB   | 39 713  |
| 8                                                                                                                                                                                                    |   | ✍ mark packet     | postrouting |              |              | packet-group1-ix  | no          |                 | 15.5 MiB   | 11 978  |
| 9                                                                                                                                                                                                    |   | ✍ mark packet     | postrouting |              |              | packet-group1-int | no          |                 | 7.7 MiB    | 11 426  |

# Hotspot – Based on Destination

- `/queue tree add name="0-Hotspot1-total-Upload" parent=global-in packet-mark="" limit-at=0 priority=1 max-limit=2M`
- `/queue tree add name="0-Hotspot1-total-Download" parent=wlan3 packet-mark="" limit-at=0 priority=1 max-limit=2M`
- `/queue tree add name="Group1-total-Download" parent=0-Hotspot1-total-Download limit-at=960k priority=1 max-limit=2M`
- `/queue tree add name="Group1-total-Upload" parent=0-Hotspot1-total-Upload limit-at=960k priority=1 max-limit=2M`
- `/queue tree add name="Group1-Total-IIX-Download" parent=Group1-total-Download packet-mark=packet-group1-iix limit-at=768k queue=default priority=4 max-limit=2M`
- `/queue tree add name="Group1-Total-INT-Download" parent=Group1-total-Download packet-mark=packet-group1-int limit-at=192k queue=default priority=3 max-limit=2M`
- `/queue tree add name="Group1-Total-IIX-Upload" parent=Group1-total-Upload packet-mark=packet-group1-iix limit-at=768k queue=default priority=4 max-limit=2M`
- `/queue tree add name="Group1-Total-INT-Upload" parent=Group1-total-Upload packet-mark=packet-group1-int limit-at=192k queue=default priority=3 max-limit=2M`



# Hotspot – Based on Destination

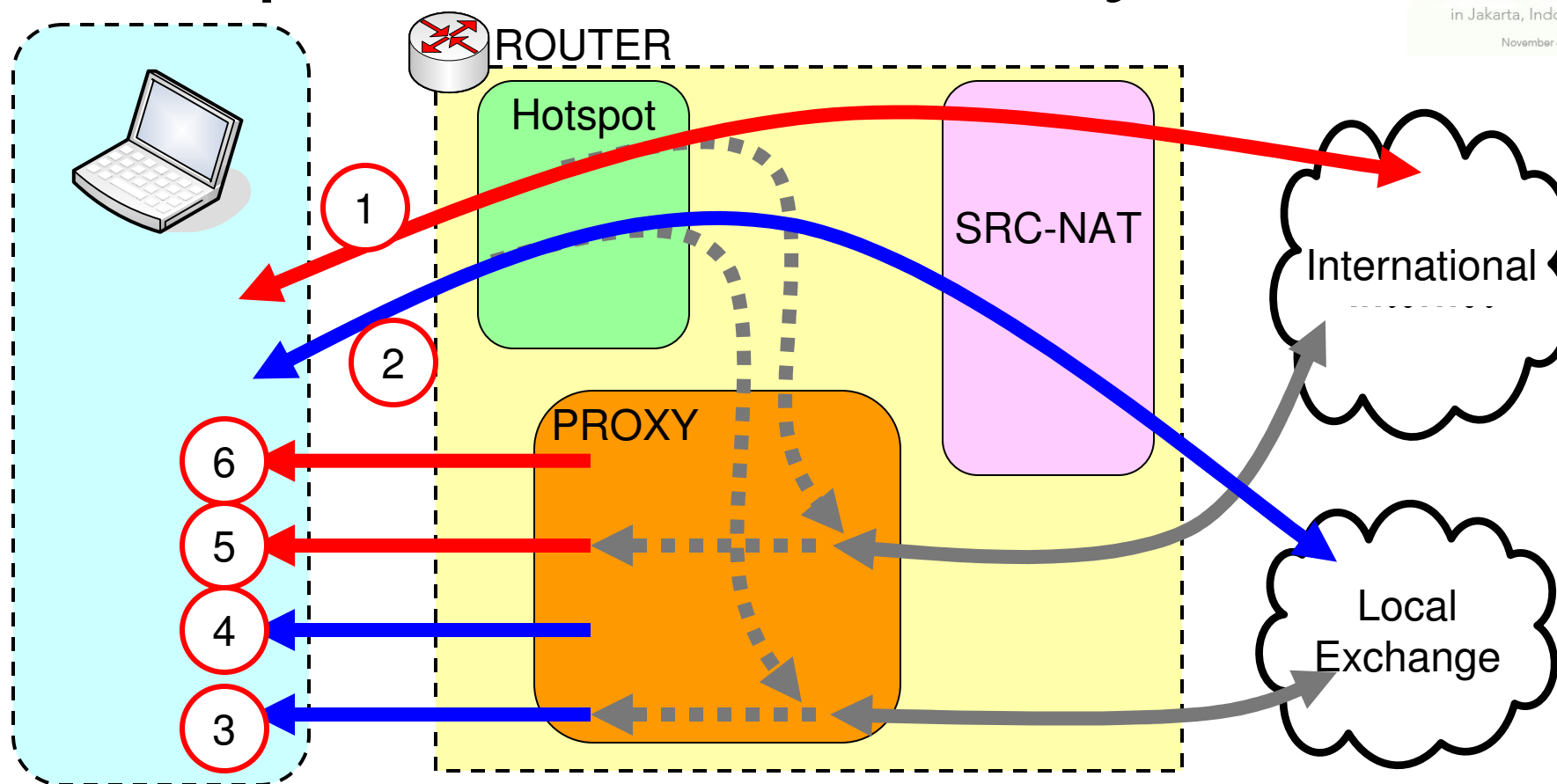


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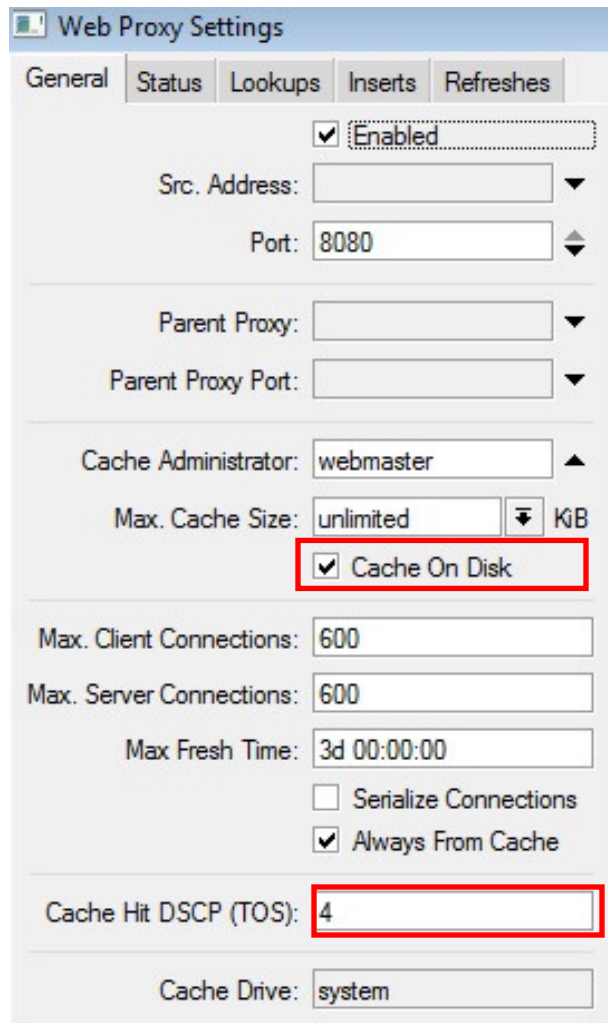
| Queue List                                                                                                                                                                                                                                                                |                           |                   |          |                   |               |           |           |         |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|----------|-------------------|---------------|-----------|-----------|---------|--|--|
| <div> <div>Simple Queues</div> <div>Interface Queues</div> <div>Queue Tree</div> <div>Queue Types</div> </div> <div> <div>+</div> <div>-</div> <div>✓</div> <div>✗</div> <div>⌵</div> <div>↺ Reset Counters</div> <div>00 Reset All Counters</div> <div>Find</div> </div> |                           |                   |          |                   |               |           |           |         |  |  |
| Name                                                                                                                                                                                                                                                                      | Parent                    | Packet Marks      | Priority | Limit At (bits/s) | Max Limit ... | Avg. Rate | Bytes     | Packets |  |  |
| 0-Hotspot1-total-Download                                                                                                                                                                                                                                                 | wlan3                     |                   | 1        |                   | 2M            | 816 bps   | 227.9 MiB | 242 836 |  |  |
| Group1-total-Download                                                                                                                                                                                                                                                     | 0-Hotspot1-total-Download |                   | 1        | 960k              | 2M            | 816 bps   | 92.1 MiB  | 95 522  |  |  |
| Group1-Total-IIX-Download                                                                                                                                                                                                                                                 | Group1-total-Download     | packet-group1-iix | 4        | 768k              | 2M            | 816 bps   | 31.4 MiB  | 29 759  |  |  |
| Group1-Total-INT-Download                                                                                                                                                                                                                                                 | Group1-total-Download     | packet-group1-int | 3        | 192k              | 2M            | 0 bps     | 26.1 MiB  | 40 477  |  |  |
| 0-Hotspot1-total-Upload                                                                                                                                                                                                                                                   | global-in                 |                   | 1        |                   | 2M            | 480 bps   | 47.2 MiB  | 206 443 |  |  |
| Group1-total-Upload                                                                                                                                                                                                                                                       | 0-Hotspot1-total-Upload   |                   | 1        | 960k              | 2M            | 480 bps   | 19.2 MiB  | 93 377  |  |  |
| Group1-Total-IIX-Upload                                                                                                                                                                                                                                                   | Group1-total-Upload       | packet-group1-iix | 4        | 768k              | 2M            | 480 bps   | 7.5 MiB   | 30 555  |  |  |
| Group1-Total-INT-Upload                                                                                                                                                                                                                                                   | Group1-total-Upload       | packet-group1-int | 3        | 192k              | 2M            | 0 bps     | 11.1 MiB  | 52 571  |  |  |

# Hotspot – Internal Proxy



|   |            |   |          |   |           |
|---|------------|---|----------|---|-----------|
| 1 | Direct INT | 3 | MISS IIX | 5 | MISS Intl |
| 2 | Direct IIX | 4 | HIT IIX  | 6 | HIT Intl  |

# Proxy



Web Proxy Settings

General Status Lookups Inserts Refreshes

☒ Enabled

Src. Address:

Port: 8080

Parent Proxy:

Parent Proxy Port:

Cache Administrator: webmaster

Max. Cache Size: unlimited  KB

☒ Cache On Disk

Max. Client Connections: 600

Max. Server Connections: 600

Max Fresh Time: 3d 00:00:00

☐ Serialize Connections

☒ Always From Cache

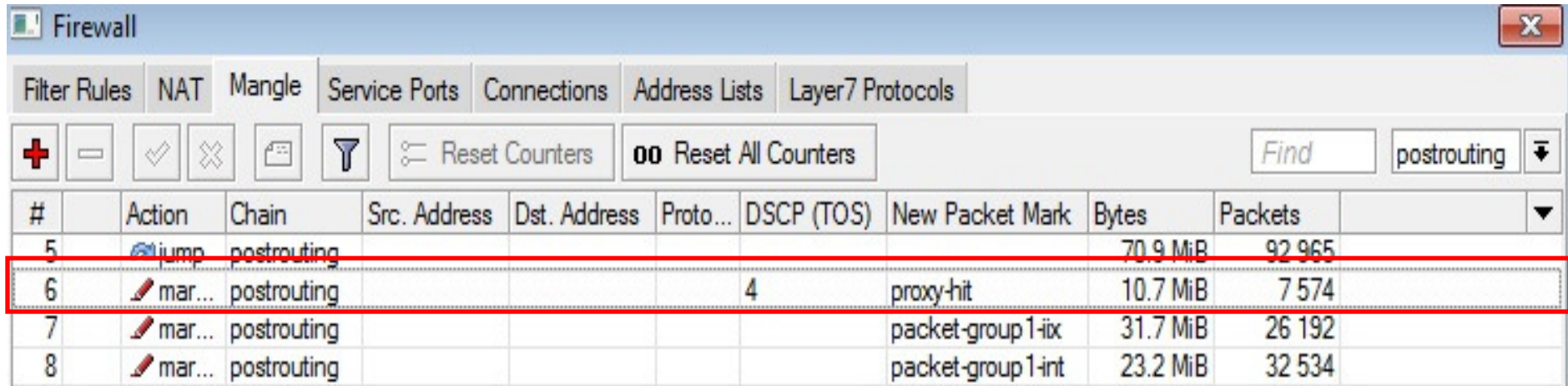
Cache Hit DSCP (TOS): 4

Cache Drive: system

- Pastikan option **Cache-On-Disk** diaktifkan.
- Parameter **TOS** digunakan untuk identifikasi traffic **HIT** atau **MISS**.
- Secondary Hardisk untuk **Cache-Drive**



# Mangle For “HIT” Traffic

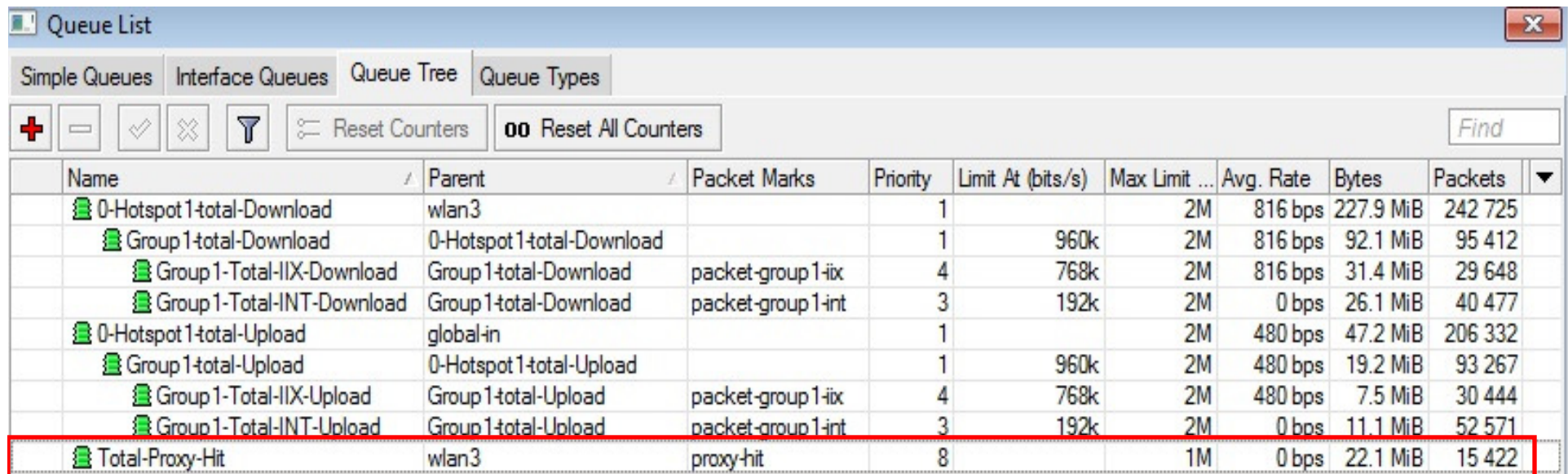


The screenshot shows the Mikrotik WinBox Firewall Mangle configuration window. The 'Mangle' tab is selected. Below the tabs, there are buttons for adding, deleting, and enabling/disabling rules, as well as a 'Reset Counters' button. A table lists the configured mangle rules. Rule 6 is highlighted with a red box. The table has columns for #, Action, Chain, Src. Address, Dst. Address, Proto..., DSCP (TOS), New Packet Mark, Bytes, and Packets.

| # | Action | Chain       | Src. Address | Dst. Address | Proto... | DSCP (TOS) | New Packet Mark   | Bytes    | Packets |
|---|--------|-------------|--------------|--------------|----------|------------|-------------------|----------|---------|
| 5 | jump   | postrouting |              |              |          |            |                   | 70.9 MiB | 92 965  |
| 6 | mar... | postrouting |              |              |          | 4          | proxy-hit         | 10.7 MiB | 7 574   |
| 7 | mar... | postrouting |              |              |          |            | packet-group1-ix  | 31.7 MiB | 26 192  |
| 8 | mar... | postrouting |              |              |          |            | packet-group1-int | 23.2 MiB | 32 534  |

- /ip firewall mangle add chain=**postrouting**  
action=mark-packet new-packet-mark=proxy-hit  
passthrough=no **dscp=4**
- Pastikan Rule “HIT” berada tepat di bawah Rule **jump**.

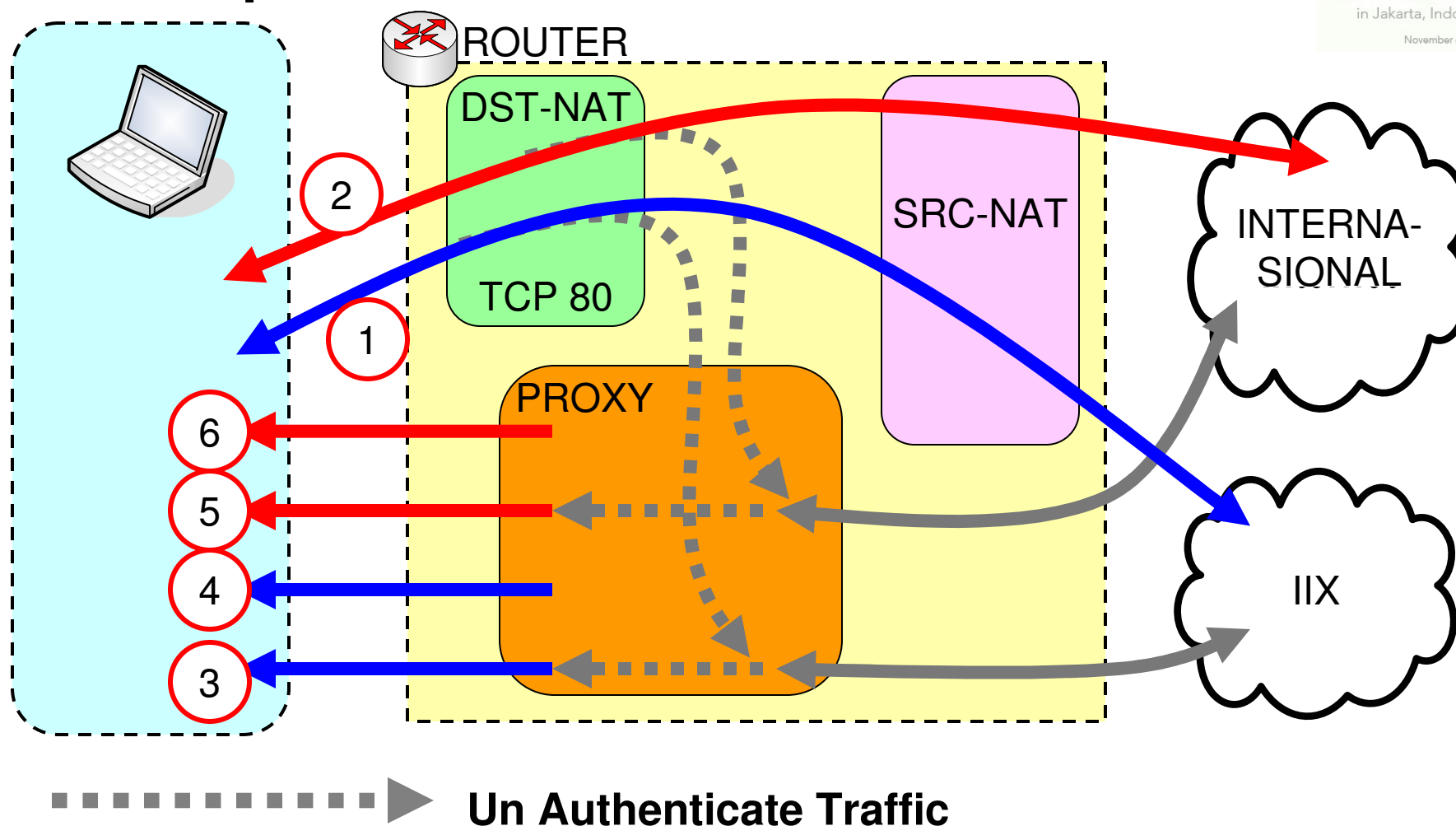
# Queue – “HIT” Traffic



| Name                      | Parent                   | Packet Marks      | Priority | Limit At (bits/s) | Max Limit ... | Avg. Rate | Bytes     | Packets |  |
|---------------------------|--------------------------|-------------------|----------|-------------------|---------------|-----------|-----------|---------|--|
| 0-Hotspot1total-Download  | wlan3                    |                   | 1        |                   | 2M            | 816 bps   | 227.9 MiB | 242 725 |  |
| Group1total-Download      | 0-Hotspot1total-Download |                   | 1        | 960k              | 2M            | 816 bps   | 92.1 MiB  | 95 412  |  |
| Group1-Total-IIX-Download | Group1total-Download     | packet-group1-iix | 4        | 768k              | 2M            | 816 bps   | 31.4 MiB  | 29 648  |  |
| Group1-Total-INT-Download | Group1total-Download     | packet-group1-int | 3        | 192k              | 2M            | 0 bps     | 26.1 MiB  | 40 477  |  |
| 0-Hotspot1total-Upload    | global-in                |                   | 1        |                   | 2M            | 480 bps   | 47.2 MiB  | 206 332 |  |
| Group1total-Upload        | 0-Hotspot1total-Upload   |                   | 1        | 960k              | 2M            | 480 bps   | 19.2 MiB  | 93 267  |  |
| Group1-Total-IIX-Upload   | Group1total-Upload       | packet-group1-iix | 4        | 768k              | 2M            | 480 bps   | 7.5 MiB   | 30 444  |  |
| Group1-Total-INT-Upload   | Group1total-Upload       | packet-group1-int | 3        | 192k              | 2M            | 0 bps     | 11.1 MiB  | 52 571  |  |
| Total-Proxy-Hit           | wlan3                    | proxy-hit         | 8        |                   | 1M            | 0 bps     | 22.1 MiB  | 15 422  |  |

- `/queue tree add name="Total-Proxy-Hit"`  
  `parent=[Interface Hotspot] packet-mark=proxy-hit`  
  `max-limit=1M`

# Hotspot - Un-Auth Traffic



# Un Authenticate Traffic - Mangle

- Un authenticate traffic adalah traffic dari user yang memiliki akses bypass.
  - /ip firewall mangle add chain=**prerouting** action=mark-connection new-connection-mark=**conn-unauth** passthrough=yes **hotspot=!auth** in-interface=[Interface Hotspot]
  - /ip firewall mangle add chain=**prerouting** action=mark-packet new-packet-mark=packet-unauth passthrough=no connection-mark=**conn-unauth**
  - /ip firewall mangle add chain=**postrouting** action=mark-packet new-packet-mark=packet-unauth passthrough=no connection-mark=**conn-unauth**

# Un Authenticate Traffic - Mangle



MikroTik User Meeting  
in Jakarta, Indonesia

November 6-7, 2009

| Firewall                                                                                                                                                                                   |   |        |             |              |              |          |            |                    |            |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------|-------------|--------------|--------------|----------|------------|--------------------|------------|---------|
| Filter Rules NAT Mangle Service Ports Connections Address Lists Layer7 Protocols                                                                                                           |   |        |             |              |              |          |            |                    |            |         |
| <div> <span>+</span> <span>-</span> <span>✓</span> <span>✗</span> <span>📁</span> <span>🔍</span> <span>00 Reset Counters</span> <span>00 Reset All Counters</span> <span>Find</span> </div> |   |        |             |              |              |          |            |                    |            |         |
| #                                                                                                                                                                                          |   | Action | Chain       | Src. Address | Dst. Address | Proto... | DSCP (TOS) | New Packet Mark    | Bytes      | Packets |
| 0                                                                                                                                                                                          | D | mar... | hotspot     | 10.5.50.253  |              |          |            | group 1-in         | 2517.6 KiB | 32 550  |
| 1                                                                                                                                                                                          | D | mar... | hotspot     |              | 10.5.50.253  |          |            | group 1-out        | 28.4 MiB   | 28 739  |
| 2                                                                                                                                                                                          |   | jump   | prerouting  |              |              |          |            |                    | 53.3 MiB   | 114 480 |
| 3                                                                                                                                                                                          |   | mar... | prerouting  |              |              |          |            |                    | 5.3 MiB    | 15 748  |
| 4                                                                                                                                                                                          |   | mar... | prerouting  |              |              |          |            | packet-group 1-ix  | 6.9 MiB    | 18 959  |
| 5                                                                                                                                                                                          |   | mar... | prerouting  |              |              |          |            |                    | 9.5 MiB    | 47 079  |
| 6                                                                                                                                                                                          |   | mar... | prerouting  |              |              |          |            | packet-group 1-int | 10.8 MiB   | 50 440  |
| 7                                                                                                                                                                                          |   | mar... | prerouting  |              |              |          |            |                    | 49.0 KiB   | 168     |
| 8                                                                                                                                                                                          |   | mar... | prerouting  |              |              |          |            | packet-unauth      | 21.1 KiB   | 73      |
| 9                                                                                                                                                                                          |   | jump   | postrouting |              |              |          |            |                    | 74.3 MiB   | 107 067 |
| 10                                                                                                                                                                                         |   | mar... | postrouting |              |              |          | 4          | proxy-hit          | 10.7 MiB   | 7 574   |
| 11                                                                                                                                                                                         |   | mar... | postrouting |              |              |          |            | packet-group 1-ix  | 32.1 MiB   | 29 543  |
| 12                                                                                                                                                                                         |   | mar... | postrouting |              |              |          |            | packet-group 1-int | 25.2 MiB   | 40 756  |
| 13                                                                                                                                                                                         |   | mar... | postrouting |              |              |          |            | packet-unauth      | 29 B       | 1       |

# Un Authenticate Traffic - Queue

- Queue dari User yang belum terautentikasi dan memiliki akses bypass akan menggunakan parent queue Hotspot-Total-Download karena walaupun memiliki akses bypass kecepatan traffic akan tetap terkendali.
  - /queue tree add name="Hotspot1-Unauth-Download" parent=**0-Hotspot1-total-Download** packet-mark=**packet-unauth** limit-at=64k priority=8 max-limit=2M
  - /queue tree add name="Hotspot1-Unauth-Upload" parent=**0-Hotspot1-total-Upload** packet-mark=**packet-unauth** limit-at=64k priority=8 max-limit=2M



# Un Authenticate Traffic - Queue

| Queue List                                                                                                                                                                                                                                                                 |                           |                   |          |                   |               |           |           |         |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|----------|-------------------|---------------|-----------|-----------|---------|--|
| <div> <div>Simple Queues</div> <div>Interface Queues</div> <div>Queue Tree</div> <div>Queue Types</div> </div> <div> <div>+</div> <div>-</div> <div>✓</div> <div>✗</div> <div>⌵</div> <div>00 Reset Counters</div> <div>00 Reset All Counters</div> <div>Find</div> </div> |                           |                   |          |                   |               |           |           |         |  |
| Name                                                                                                                                                                                                                                                                       | Parent                    | Packet Marks      | Priority | Limit At (bits/s) | Max Limit ... | Avg. Rate | Bytes     | Packets |  |
| 0-Hotspot1-total-Download                                                                                                                                                                                                                                                  | wlan3                     |                   | 1        |                   | 2M            | 1632 bps  | 228.0 MiB | 243 663 |  |
| Group1-total-Download                                                                                                                                                                                                                                                      | 0-Hotspot1-total-Download |                   | 1        | 960k              | 2M            | 816 bps   | 92.2 MiB  | 96 153  |  |
| Group1-Total-IIX-Download                                                                                                                                                                                                                                                  | Group1-total-Download     | packet-group1-iix | 4        | 768k              | 2M            | 816 bps   | 31.5 MiB  | 30 389  |  |
| Group1-Total-INT-Download                                                                                                                                                                                                                                                  | Group1-total-Download     | packet-group1-int | 3        | 192k              | 2M            | 0 bps     | 26.1 MiB  | 40 477  |  |
| Group2-total-Download                                                                                                                                                                                                                                                      | 0-Hotspot1-total-Download |                   | 1        | 960k              | 2M            | 0 bps     | 0 B       | 0       |  |
| Hotspot1-Unauth-Download                                                                                                                                                                                                                                                   | 0-Hotspot1-total-Download | packet-unauth     | 8        | 64k               | 2M            | 816 bps   | 20.5 KiB  | 197     |  |
| 0-Hotspot1-total-Upload                                                                                                                                                                                                                                                    | global-in                 |                   | 1        |                   | 2M            | 15.1 kbps | 47.5 MiB  | 210 927 |  |
| Group1-total-Upload                                                                                                                                                                                                                                                        | 0-Hotspot1-total-Upload   |                   | 1        | 960k              | 2M            | 480 bps   | 19.3 MiB  | 94 008  |  |
| Group1-Total-IIX-Upload                                                                                                                                                                                                                                                    | Group1-total-Upload       | packet-group1-iix | 4        | 768k              | 2M            | 480 bps   | 7.5 MiB   | 31 185  |  |
| Group1-Total-INT-Upload                                                                                                                                                                                                                                                    | Group1-total-Upload       | packet-group1-int | 3        | 192k              | 2M            | 0 bps     | 11.1 MiB  | 52 571  |  |
| Group2-total-Upload                                                                                                                                                                                                                                                        | 0-Hotspot1-total-Upload   |                   | 1        | 960k              | 2M            | 0 bps     | 0 B       | 0       |  |
| Hotspot1-Unauth-Upload                                                                                                                                                                                                                                                     | 0-Hotspot1-total-Upload   | packet-unauth     | 8        | 64k               | 2M            | 14.7 kbps | 295.3 KiB | 3 854   |  |
| Total-Proxy-Hit                                                                                                                                                                                                                                                            | wlan3                     | proxy-hit         | 8        |                   | 1M            | 0 bps     | 0 B       | 0       |  |

# Workshop



- Demo
- Q & A