# IP Spoofing & BCP38

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Asunción - Paraguay



MKE solutions

# Presentación Personal

- Nombre: Mario Clep
- Profesión: Ing. en Telecomunicaciones
- ***CTO MKE Solutions***
- Consultor y Entrenador ***MikroTik RouterOS***
- Experiencia desde 2005


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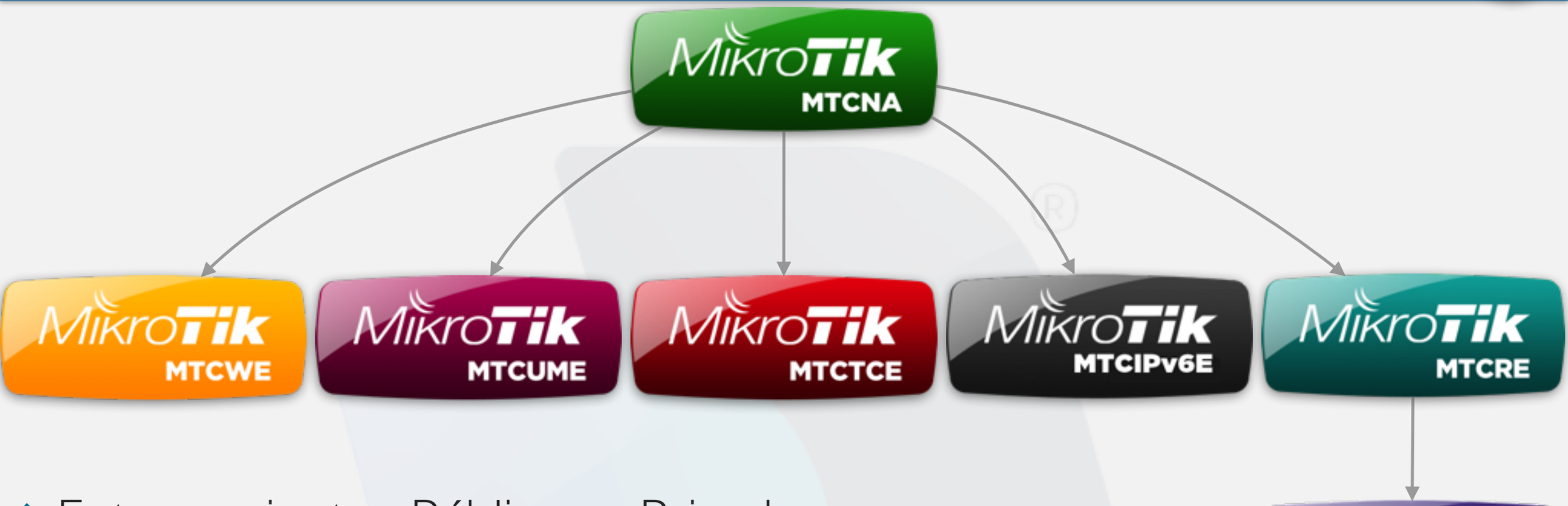


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# Introducción y Objetivos

Mas allá de proteger el router deshabilitando los servicios que no se utilizan e implementando reglas de Firewall, también es necesario implementar reglas que controlen el tráfico desde/hacia sus clientes.

- **RFC2827 (BCP38).**
- RFC3704 (BCP86): RP-Filter.
- Puertos más comunes a proteger.
- IDS / IPS / mitigadores.
- BGP Blackholing.

# El problema…

Torch (Running)

Basic

Interface: ether3

Entry Timeout: 00:00:03 s

Collect

- [x] Src. Address
- [x] Dst. Address
- [x] MAC Protocol
- [x] Protocol
- [ ] DSCP
- [ ] Src. Address6
- [ ] Dst. Address6
- [x] Port
- [ ] VLAN Id

Filters

Src. Address: 0.0.0.0/0

Dst. Address: [redacted]

Src. Address6: ::/0

Dst. Address6: ::/0

MAC Protocol: all

Protocol: any

Port: any

VLAN Id: any

DSCP: any

| Eth. Pro... | Protocol | Src. | Dst. | VLAN Id | DSCP | Tx Rate | Rx Rate | Tx Pack... | Rx Pack... |
|---|---|---|---|---|---|---|---|---|---|
| 800 (ip) | 17 (udp) | 31.76.153.223:35978 | [redacted]:27610 | | | 0 bps | 744 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 32.19.202.196:39908 | [redacted]:27147 | | | 0 bps | 744 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 32.37.142.48:61061 | [redacted]:27201 | | | 0 bps | 744 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.83.117.100:17881 | [redacted]:27041 | | | 0 bps | 664 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.56.178.81:27634 | [redacted]:27767 | | | 0 bps | 656 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.102.163.139:44750 | [redacted]:27558 | | | 0 bps | 656 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.193.74.77:10115 | [redacted]:27868 | | | 0 bps | 624 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.196.149.127:19084 | [redacted]:27912 | | | 0 bps | 624 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.200.180.117:52663 | [redacted]:27638 | | | 0 bps | 624 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 30.211.242.93:50994 | [redacted]:27398 | | | 0 bps | 616 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.6.180.183:50773 | [redacted]:27126 | | | 0 bps | 616 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.73.198.161:17520 | [redacted]:27649 | | | 0 bps | 616 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.92.41.152:18751 | [redacted]:27107 | | | 0 bps | 600 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.103.203.105:38230 | [redacted]:27232 | | | 0 bps | 600 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.164.165.10:28313 | [redacted]:27204 | | | 0 bps | 600 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.175.155.111:11108 | [redacted]:27476 | | | 0 bps | 600 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 32.18.148.207:55999 | [redacted]:27964 | | | 0 bps | 600 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 30.204.198.217:27609 | [redacted]:27628 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.11.133.75:39861 | [redacted]:27848 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.33.125.24:46028 | [redacted]:27493 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.77.218.138:16417 | [redacted]:27743 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.88.132.122:50210 | [redacted]:27391 | | | 0 bps | 592 bps | 0 | 1 |

900 items | Total Tx: 0 bps | Total Rx: 13.9 Mbps | Total Tx Packet: 0 | Total Rx Packet: 26 843

# El problema…

Torch (Running)

Basic

Interface: ether3

Entry Timeout: 00:00:03 s

Collect

- [x] Src. Address
- [x] Dst. Address
- [x] MAC Protocol
- [x] Protocol
- [ ] DSCP
- [ ] Src. Address6
- [ ] Dst. Address6
- [x] Port
- [ ] VLAN Id

Filters

Src. Address: 0.0.0.0/0

Dst. Address: [redacted]

Src. Address6: ::/0

Dst. Address6: ::/0

MAC Protocol: all

Protocol: any

Port: any

VLAN Id: any

DSCP: any

| Eth. Pro... | Protocol | Src. | Dst. | VLAN Id | DSCP | Tx Rate | Rx Rate | Tx Pack... | Rx Pack... |
|---|---|---|---|---|---|---|---|---|---|
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| 800 (ip) | 17 (udp) | 31.175.155.111:11108 | [redacted]:27476 | | | 0 bps | 600 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 32.18.148.207:55999 | [redacted]:27964 | | | 0 bps | 600 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 30.204.198.217:27609 | [redacted]:27628 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.11.133.75:39861 | [redacted]:27848 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.33.125.24:46028 | [redacted]:27493 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.77.218.138:16417 | [redacted]:27743 | | | 0 bps | 592 bps | 0 | 1 |
| 800 (ip) | 17 (udp) | 31.88.132.122:50210 | [redacted]:27391 | | | [redacted] | [redacted] | [redacted] | [redacted] |

900 items | Total Tx: 0 bps | Total Rx: 13.9 Mbps | Total Tx Packet: 0 | Total Rx Packet: 26 843

# Análisis

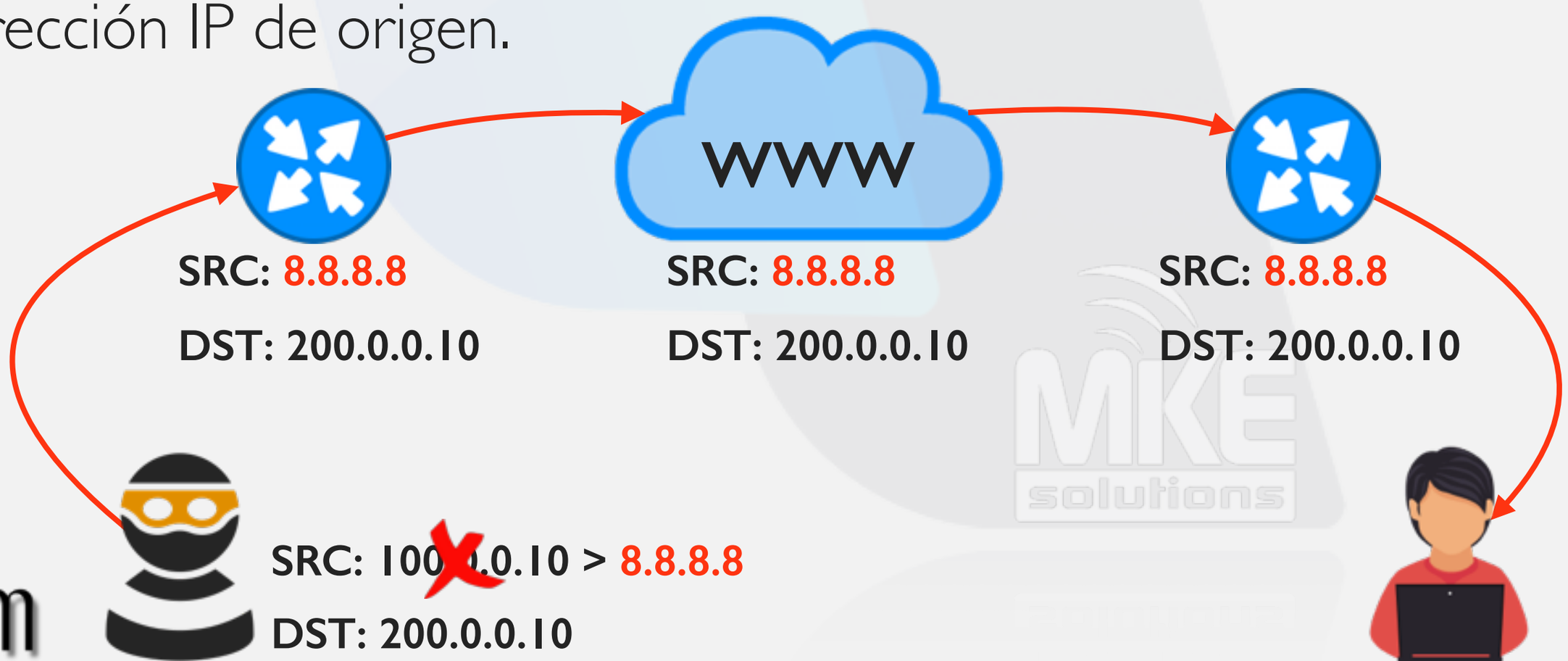
- Interfaz de entrada: WAN
- Todo el tráfico es UDP.
- **IP origen aleatoria.**
- **Puerto de origen aleatorio.**

- IP destino > Cliente atacado.
- **Puerto de destino aleatorio.**
- Paquetes recibidos: 26800.
- Paquetes enviados: 0.

# ¿Qué es el IP Spoofing?

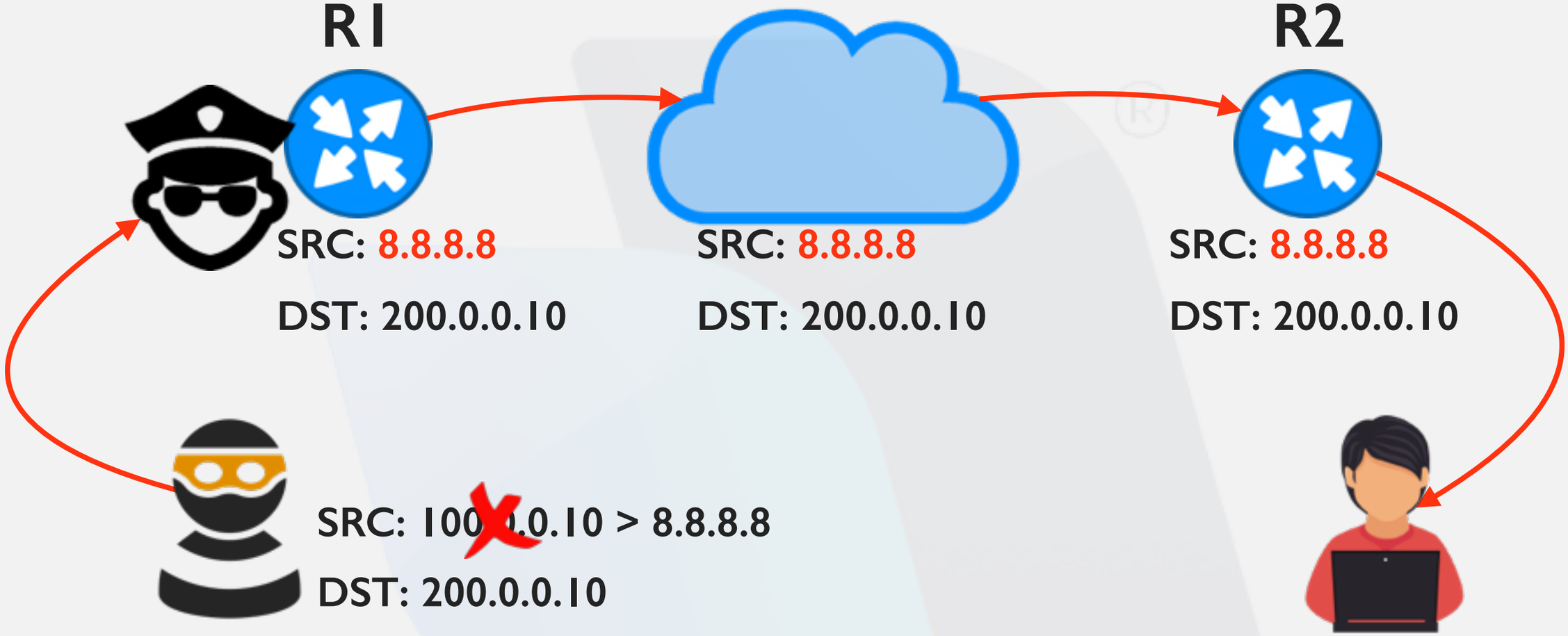
- Sustitución de la dirección IP de origen de un paquete IP por otra totalmente falsa.

- Un router **normalmente** inspecciona la cabecera IP, busca la dirección IP de destino y la compara con su tabla de enrutamiento para determinar cual es el próximo salto, pero no hace nada con la dirección IP de origen.



# ¿Se puede hacer algo?

- **Filtrar el tráfico válido antes que sea demasiado tarde!**



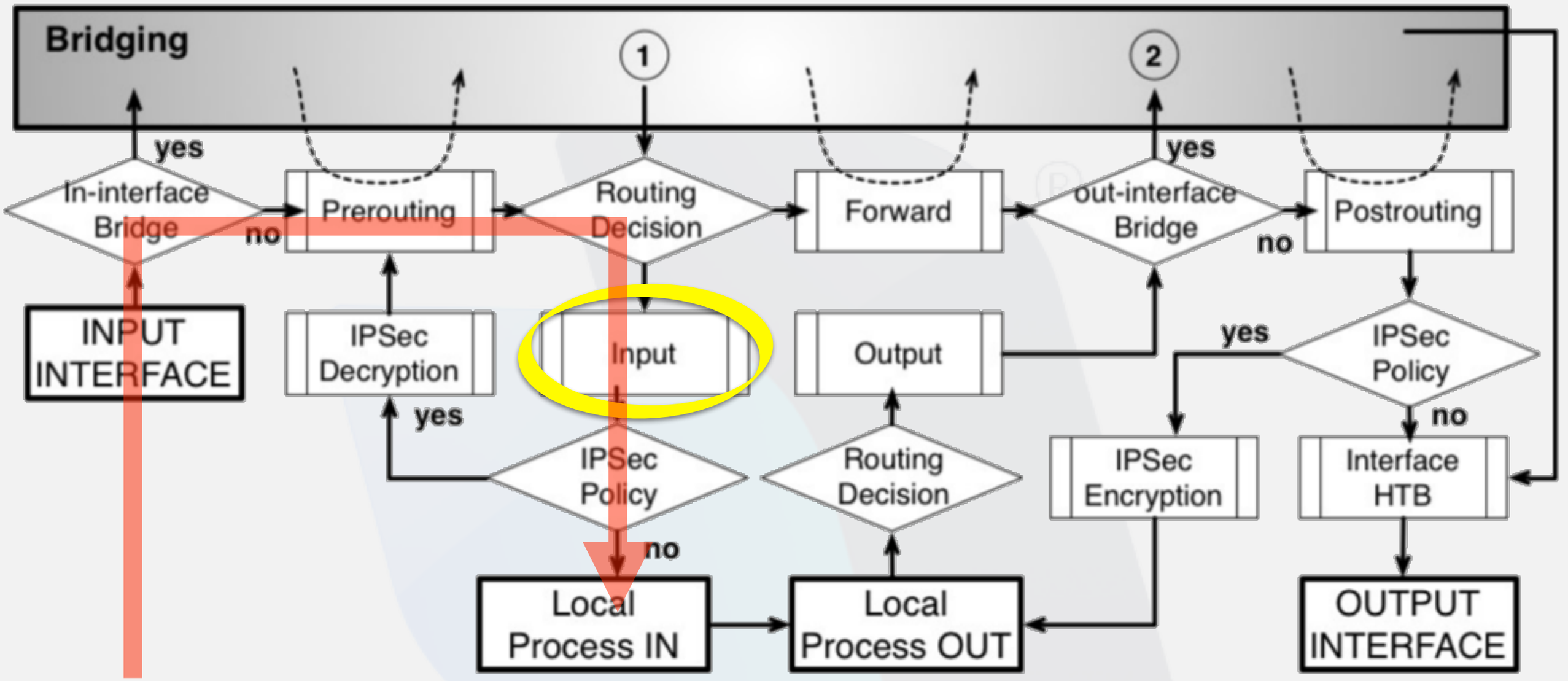

- **R2** no tiene manera de reconocer si el nuevo origen **8.8.8.8** es verdadero o falso.

- Implementar BCP38 ó uRPF.

# BCP38

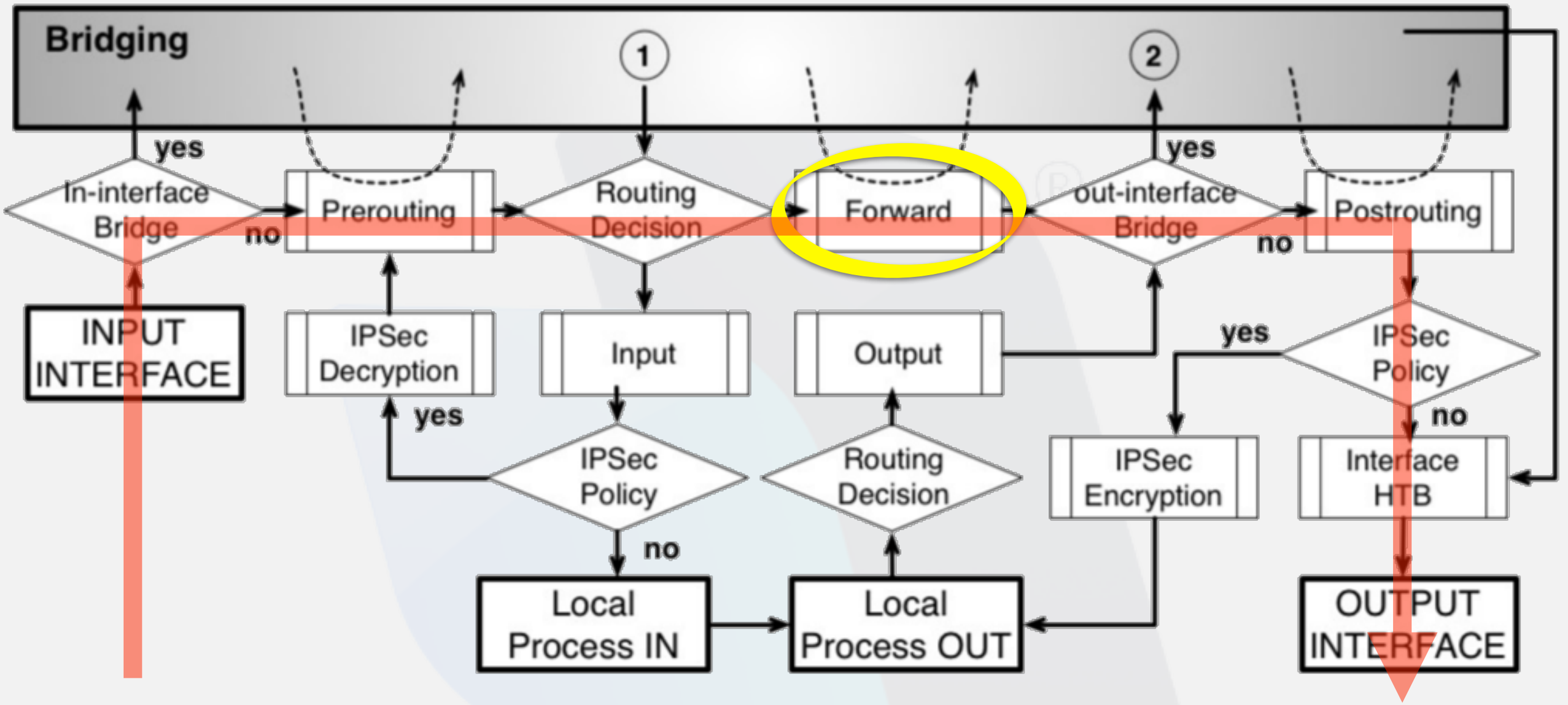
- **Que?** BCP38: Best Current Practice 38 > RFC2827
- **Cuando?** Mayo de 2000.
- **Porqué?** Eliminar los ataques DoS provocados por IP Spoofing y detectar el verdadero origen del ataque.
- **Cómo?** Bloqueando el tráfico que ingrese al router con *direcciones IP de origen diferentes a nuestras propias direcciones*.
- **Donde?** En las interfaces locales de nuestros routers.

# MUM Diagrama de Flujo en RouterOS




- Ataque dirigidos al router.
- */ip firewall filter add* ***chain=input…***

# MUM Diagrama de Flujo en RouterOS




- Ataques que no son dirigidos al router.
- *Ip firewall filter add* ***chain=forward…***

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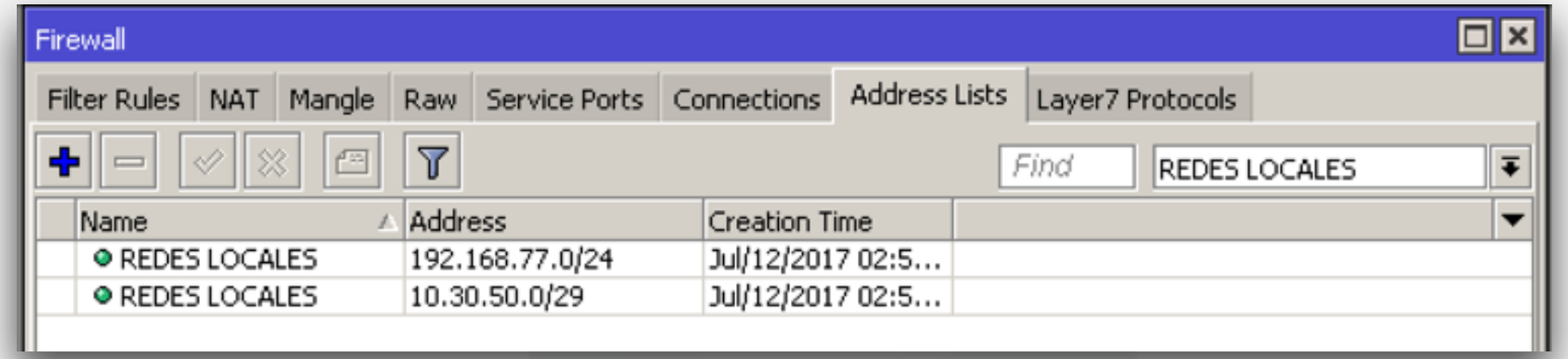
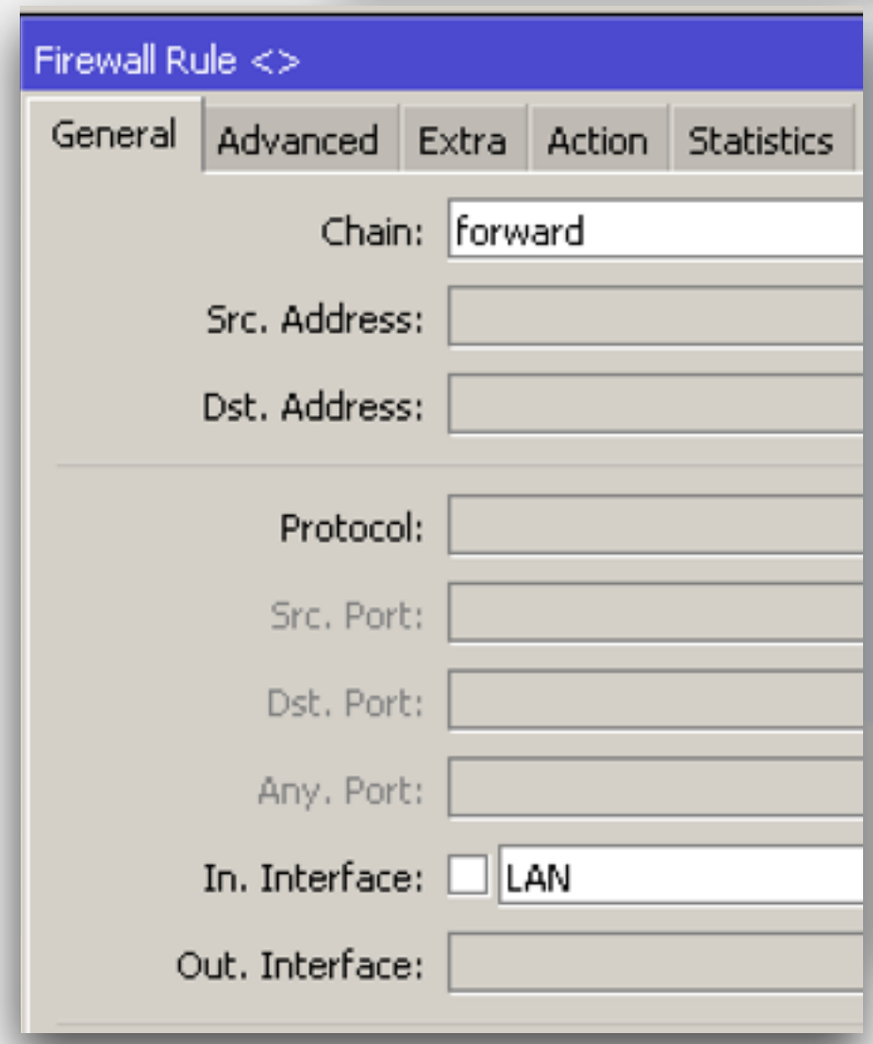
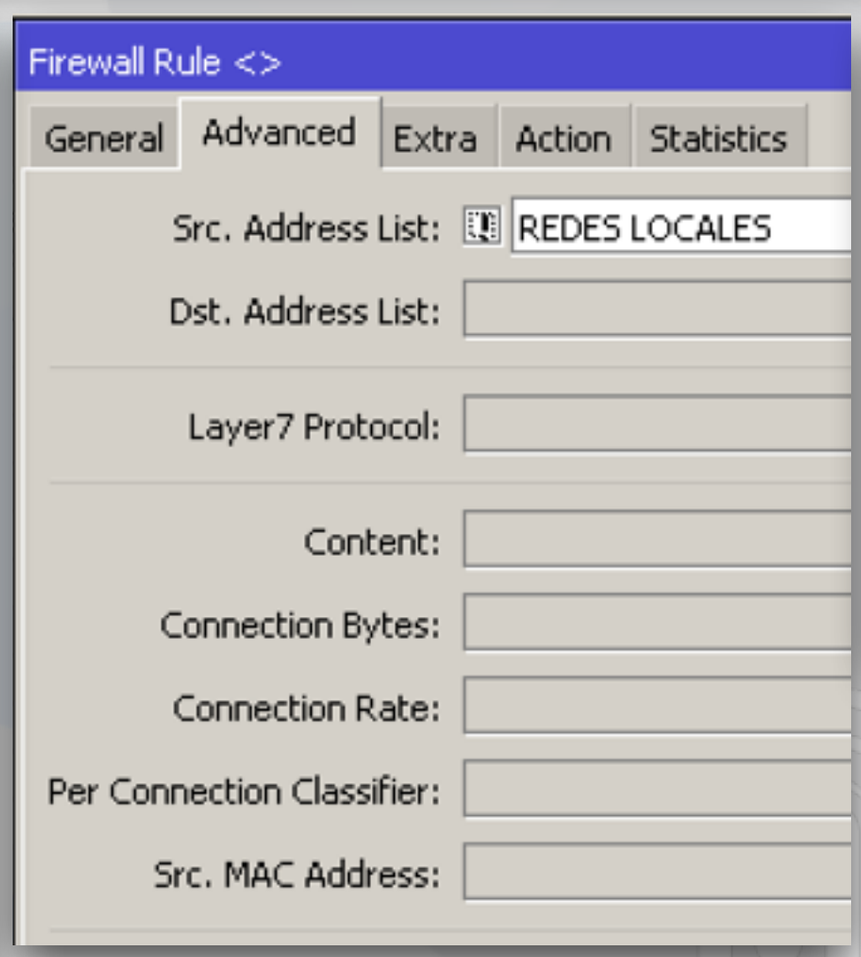
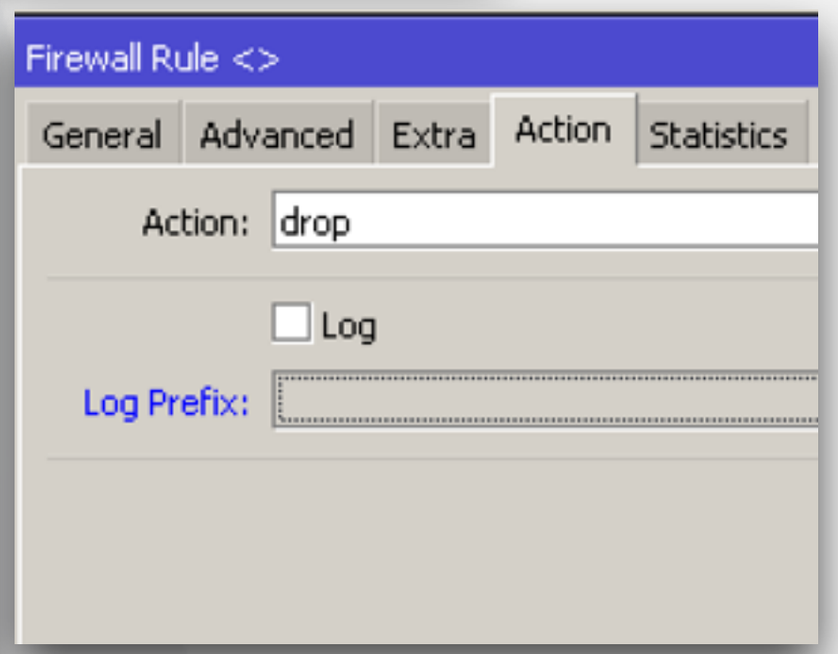
# Reglas de Firewall



# Reglas de Firewall

```
/ ip firewall address-list
add address=192.168.78.0/24 list="REDES LOCALES"
add address=10.30.50.0/29 list="REDES LOCALES"

/ ip firewall filter
add chain=forward in-interface=LAN src-address-list=!"REDES LOCALES"  \
action=drop comment=BCP38

add chain=input in-interface=LAN src-address-list=!"REDES LOCALES"  \
action=drop comment=BCP38
```

# DoS en acción sin BCP38

Session: 192.168.77.1 Uptime: 02:21:08 CPU: 100%

Torch (Running)

Basic
- Interface: LAN
- Entry Timeout: 00:00:03 s

Collect
- [x] Src. Address
- [x] Dst. Address
- [x] MAC Protocol
- [x] Protocol
- [ ] DSCP
- [ ] Src. Address6
- [ ] Dst. Address6
- [x] Port
- [ ] VLAN Id

Filters
- Src. Address: 0.0.0.0/0
- Dst. Address: 0.0.0.0/0
- Src. Address6: ::/0
- Dst. Address6: ::/0
- MAC Protocol: all
- Protocol: any
- Port: any
- VLAN Id: any
- DSCP: any

Start | Stop | Close | New Window

| Eth. Pr... | Protocol | Src. | Dst. | VLAN Id | DSCP | Tx Rate | Rx Rate | Tx Pack... | Rx Pack... |
|---|---|---|---|---|---|---|---|---|---|
| 800 (ip) | 6 (tcp) | 192.168.77.209:52817 | 192.168.77.1:8291 (winb... | | | 127.3 k... | 11.1 kbps | 14 | 16 |
| 800 (ip) | 6 (tcp) | 192.168.77.209:52836 | 64.233.190.189:443 (htt... | | | 1000 bps | 528 bps | 1 | 1 |
| 800 (ip) | 6 (tcp) | 3.223.162.77:1833 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.211.77.33:1925 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 4.9.70.207:1976 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.53.25.223:2022 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.251.102.150:2042 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 4.25.36.115:2050 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.178.211.238:2108 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.133.100.79:2187 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.90.233.152:2217 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.20.213.173:2221 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.218.95.117:2265 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.255.252.167:2417 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 4.28.4.205:2438 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.33.28.145:2494 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 4.48.252.183:2522 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 4.28.49.205:2677 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.167.114.104:2753 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 4.17.176.232:2780 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.99.240.208:2797 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.139.233.130:2839 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 4.59.193.44:2923 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.2.233.118:2959 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 3.244.151.76:3024 | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | 6 (tcp) | 2.15.130.244:3031 (eppc) | 200.200.200.1:80 (http) | | | 0 bps | 432 bps | 0 | 1 |

607 items | Total Tx: 318.7 kbps | Total Rx: 3.0 Mbps | Total Tx Packet: 37 | Total Rx Packet: 7 106

# DoS en acción sin BCP38

Session: 192.168.77.1 — Uptime: 02:28:4 — CPU: 100%

Firewall

Filter Rules | NAT | Mangle | Raw | Service Ports | Connections | Address Lists | Layer7 Protocols

Tracking — Find

| | Src. Address | Dst. Address | Prot... | Connecti... | Timeout | TCP State | Orig./Repl. Rate |
|---|---|---|---|---|---|---|---|
| SC | 1.1.1.1 | 1.1.1.3 | 1 (ic... | | 00:00:00 | | 0 bps/0 bps |
| Cs | 1.18.43.89:19793 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.23.79.95:19394 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.43.117.108:19342 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.51.79.90:12843 | 200.200.200.1:80 | 6 (tcp) | | 00:00:01 | syn sent | 0 bps/0 bps |
| Cs | 1.57.185.192:19264 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.66.171.147:27191 | 200.200.200.1:80 | 6 (tcp) | | 00:00:01 | syn sent | 0 bps/0 bps |
| Cs | 1.73.170.172:5108 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.79.76.23:31804 | 200.200.200.1:80 | 6 (tcp) | | 00:00:02 | syn sent | 0 bps/0 bps |
| Cs | 1.79.197.40:46534 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.109.105.116:36111 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.114.232.18:3345 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.123.18.179:3369 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.152.3.79:2575 | 200.200.200.1:80 | 6 (tcp) | | 00:00:01 | syn sent | 0 bps/0 bps |
| Cs | 1.154.73.159:46582 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.154.180.110:3246 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.167.115.253:3415 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.168.254.183:19082 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.177.60.236:30762 | 200.200.200.1:80 | 6 (tcp) | | 00:00:01 | syn sent | 0 bps/0 bps |
| Cs | 1.177.90.211:19675 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.177.179.183:4032 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |
| Cs | 1.180.89.23:41707 | 200.200.200.1:80 | 6 (tcp) | | 00:00:00 | syn sent | 0 bps/0 bps |

3789 items out of 35308 (1 selected) | Max Entries: 218008

Start | Stop | Close | ew Window

# DoS en acción con BCP38

Session: 192.168.77.1 Uptime: 02:35:59 CPU: 66%

Torch

Basic

Interface: LAN

Entry Timeout: 00:00:03 s

Collect

- [x] Src. Address
- [x] Dst. Address
- [ ] MAC Protocol
- [ ] Protocol
- [ ] DSCP
- [x] Src. Address6
- [x] Dst. Address6
- [ ] Port
- [ ] VLAN Id

Filters

Src. Address: 0.0.0.0/0

Dst. Address: 0.0.0.0/0

Src. Address6: ::/0

Dst. Address6: ::/0

MAC Protocol: all

Protocol: any

Port: any

VLAN Id: any

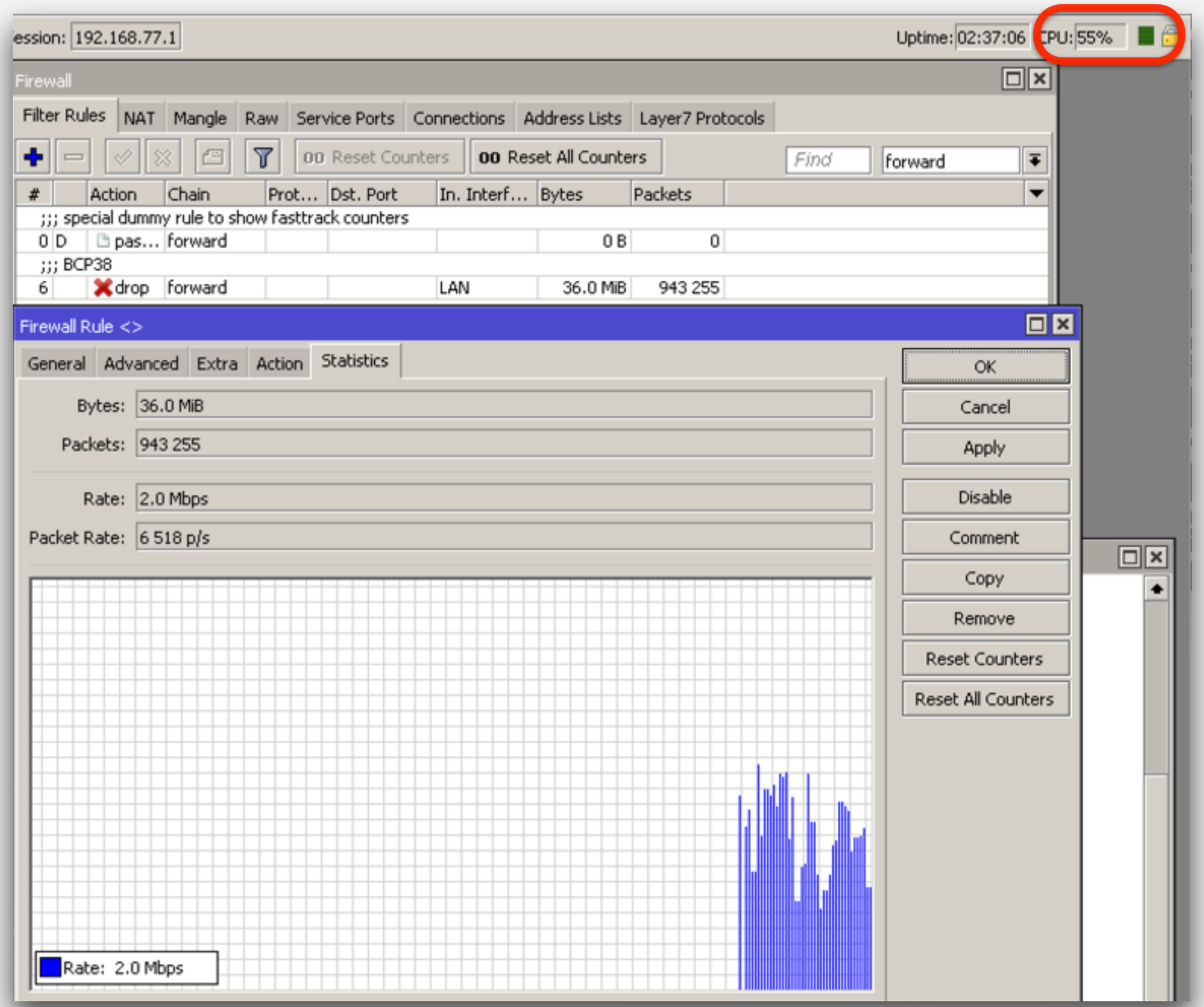
DSCP: any

Start | Stop | Close | New Window

| Eth. Pr... | Protocol | Src. | Dst. | VLAN Id | DSCP | Tx Rate | Rx Rate | Tx Pack... | Rx Pack... |
|---|---|---|---|---|---|---|---|---|---|
| 800 (ip) | | 14.190.192.90 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 15.223.90.7 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 13.254.172.25 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 17.74.22.214 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 17.46.84.165 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.161.100.17 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 13.91.103.213 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.14.227.159 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.115.18.69 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 15.16.156.66 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.74.140.250 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.248.156.6 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.106.133.162 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 17.20.6.30 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 17.100.194.248 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.69.170.103 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 15.167.179.128 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 13.179.111.212 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 15.17.29.248 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 17.15.237.62 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 15.216.62.7 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 16.28.167.131 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 14.115.16.237 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 16.149.237.17 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 17.104.146.3 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |
| 800 (ip) | | 13.250.196.28 | 200.200.200.1 | | | 0 bps | 432 bps | 0 | 1 |

3600 items | Total Tx: 119.6 kbps | Total Rx: 3.4 Mbps | Total Tx Packet: 19 | Total Rx Packet: 7 932

# DoS en acción con BCP38



# MUM Resultados del ataque con BCP38

Session: 192.168.77.1 Uptime: 02:37:22 CPU: 55%

Firewall

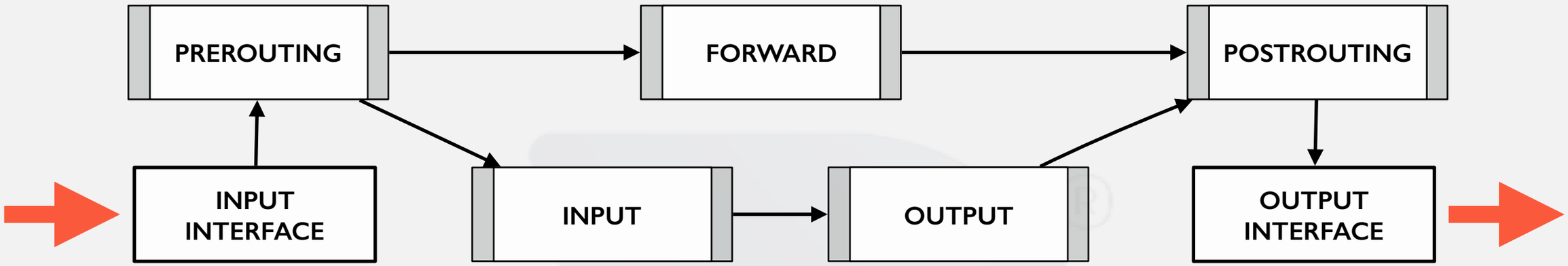
Filter Rules | NAT | Mangle | Raw | Service Ports | Connections | Address Lists | Layer7 Protocols

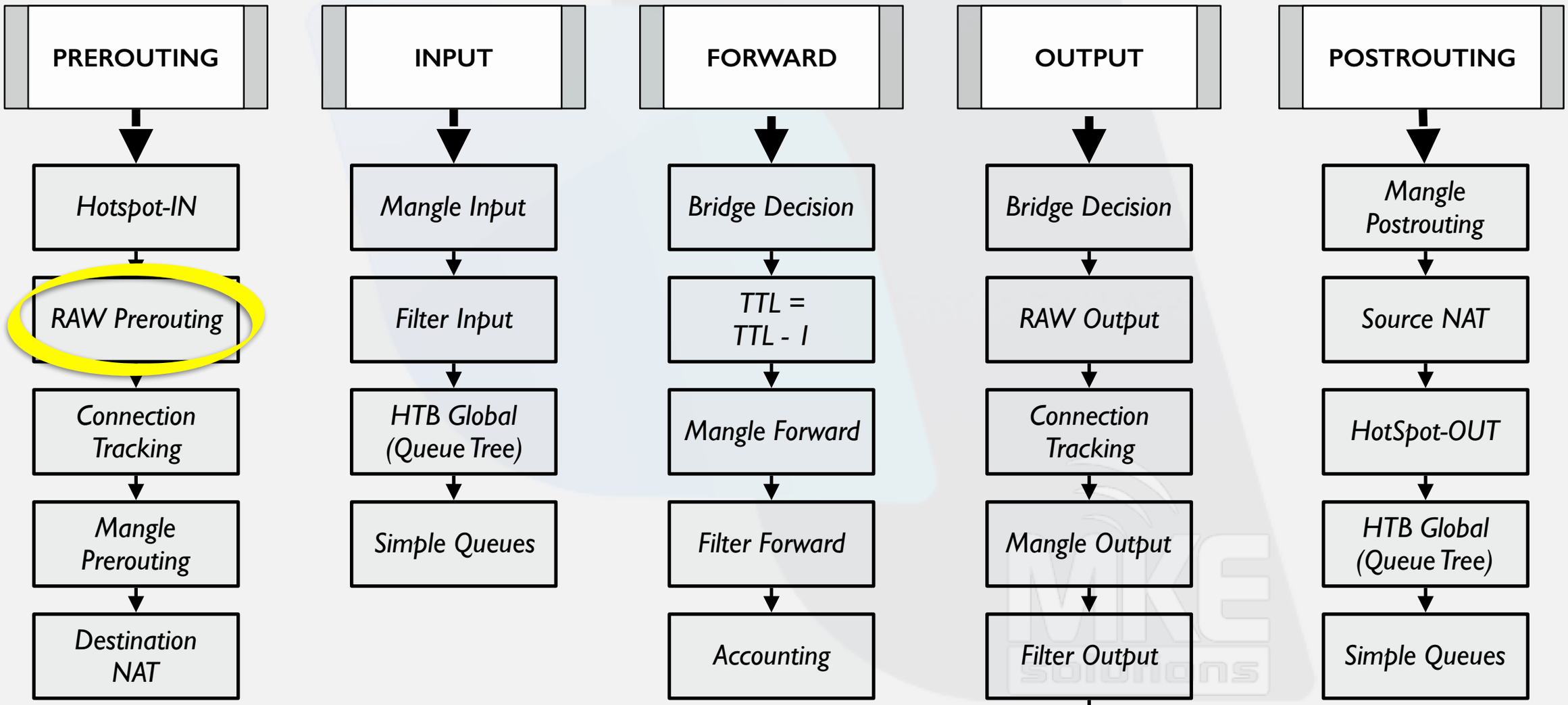
Tracking | Find

| | Src. Address | Dst. Address | Prot... | Connecti... | Timeout | TCP State | Orig./Repl. Rate |
|---|---|---|---|---|---|---|---|
| SC | 1.1.1.1 | 1.1.1.3 | 1 (ic... | | 00:00:03 | | 0 bps/0 bps |
| C | 10.30.50.1:44344 | 255.255.255.255:5... | 17 (... | | 00:00:06 | | 0 bps/0 bps |
| SACs | 10.30.50.2:5060 | 190.11.152.82:3478 | 17 (... | | 00:02:09 | | 0 bps/0 bps |
| SACs | 10.30.50.2:5060 | 190.226.45.39:5060 | 17 (... | | 00:59:09 | | 0 bps/0 bps |
| SC | 186.137.27.104 | 8.8.8.8 | 1 (ic... | | 00:00:04 | | 0 bps/0 bps |
| EC | 186.137.27.104 | 186.137.26.132 | 47 (... | | 00:09:56 | | 0 bps/0 bps |
| ESAC | 186.137.27.104 | 186.137.26.132 | 47 (... | | 04:59:53 | | 0 bps/0 bps |
| SAC | 186.137.27.104:34989 | 186.137.26.132:1723 | 6 (tcp) | | 04:59:53 | time wait | 0 bps/0 bps |
| SAC | 186.137.27.104:34990 | 186.137.26.132:1723 | 6 (tcp) | | 23:59:44 | established | 0 bps/0 bps |
| C | 192.168.77.1:47363 | 255.255.255.255:5... | 17 (... | | 00:00:06 | | 0 bps/0 bps |
| SACs | 192.168.77.200:41710 | 74.125.204.188:5228 | 6 (tcp) | | 23:44:51 | established | 0 bps/0 bps |
| SACs | 192.168.77.200:42419 | 64.233.190.188:5228 | 6 (tcp) | | 22:18:28 | established | 0 bps/0 bps |
| SACs | 192.168.77.200:42427 | 64.233.190.188:5228 | 6 (tcp) | | 22:18:48 | established | 0 bps/0 bps |
| SACs | 192.168.77.200:42429 | 64.233.190.188:5228 | 6 (tcp) | | 22:28:36 | established | 0 bps/0 bps |
| SACs | 192.168.77.200:44291 | 169.47.5.236:5222 | 6 (tcp) | | 23:58:53 | established | 0 bps/0 bps |
| SACs | 192.168.77.200:46811 | 64.233.186.188:5228 | 6 (tcp) | | 22:18:15 | established | 0 bps/0 bps |
| SACs | 192.168.77.200:46918 | 64.233.186.188:5228 | 6 (tcp) | | 23:33:11 | established | 0 bps/0 bps |
| SACs | 192.168.77.200:47101 | 64.233.186.188:5228 | 6 (tcp) | | 23:38:02 | established | 0 bps/0 bps |
| SACs | 192.168.77.201:54069 | 17.188.164.87:5223 | 6 (tcp) | | 23:54:10 | established | 0 bps/0 bps |
| C | 192.168.77.209:17500 | 192.168.77.255:17... | 17 (... | | 00:00:08 | | 0 bps/0 bps |
| C | 192.168.77.209:17500 | 255.255.255.255:1... | 17 (... | | 00:00:08 | | 0 bps/0 bps |
| SACs | 192.168.77.209:51745 | 169.55.74.36:443 | 6 (tcp) | | 23:59:49 | established | 0 bps/0 bps |

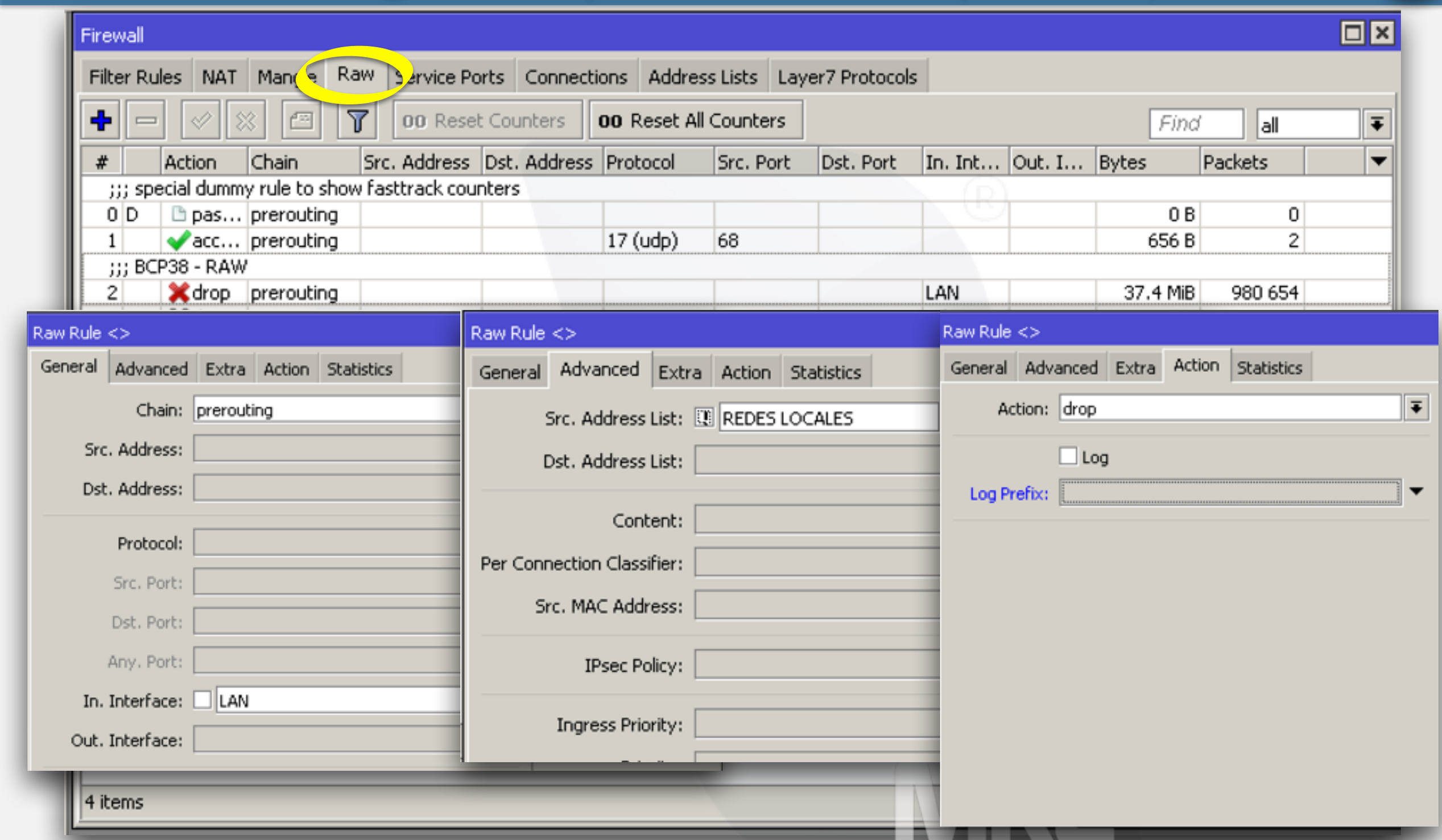
48 items | Max Entries: 218008

# RAW en RouterOS v6



# Reglas Optimizadas (RAW)




- Regla simplificada!!!

# Resultados Finales (RAW)

Session: 192.168.77.1 — Uptime: 03:02:18 — CPU: 27%

Firewall

Filter Rules | NAT | Mangle | Raw | Service Ports | Connections | Address Lists | Layer7 Protocols

00 Reset Counters | 00 Reset All Counters | Find | all

| # | | Action | Chain | Src. Address | Dst. Address | Protocol | Src. Port | Dst. Port | In. Int... | Out. I... | Bytes | Packets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ;;; special dummy rule to show fasttrack counters | | | | | | | | | | | | |
| 0 | D | pas... | prerouting | | | | | | | | 0 B | 0 |
| 1 | | acc... | prerouting | | | 17 (udp) | 68 | | | | 656 B | 2 |
| ;;; BCP38 - RAW | | | | | | | | | | | | |
| 2 | | drop | prerouting | | | | | | LAN | | 22.5 MiB | 589 218 |
| 3 | X | drop | prerouting | | | | | | ether5 | | 0 B | 0 |

Raw Rule <>

General | Advanced | Extra | Action | Statistics

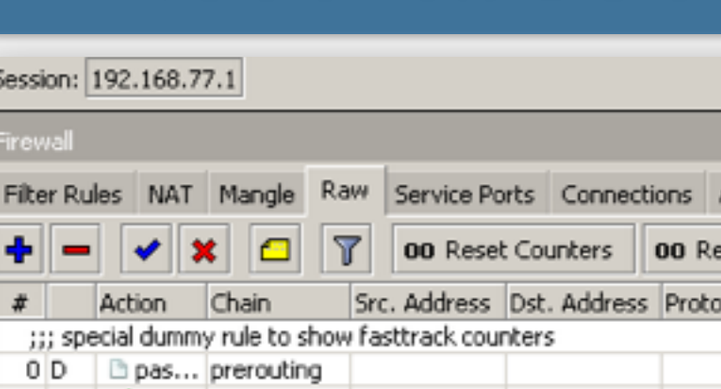
OK

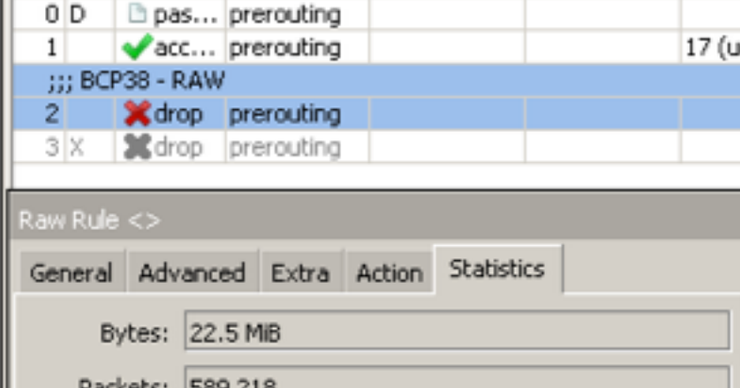
Bytes: 22.5 MiB

Packets: 589 218

Rate: 3.6 Mbps

Packet Rate: 11 424 p/s




enabled

Profile (Running)

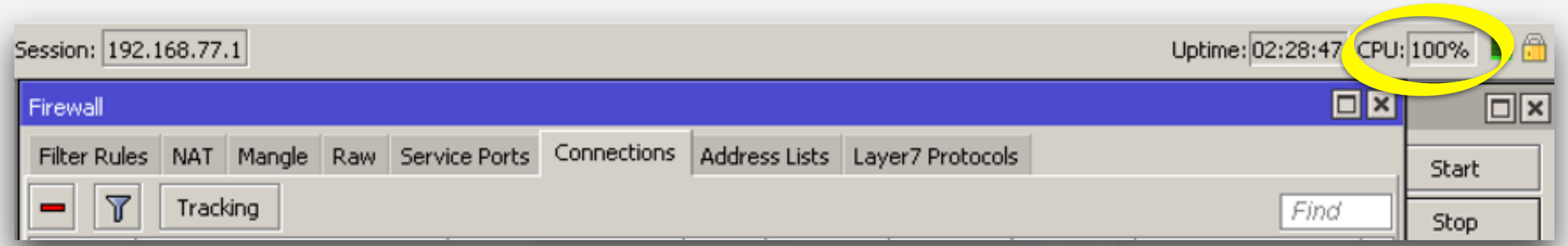
CPU: all

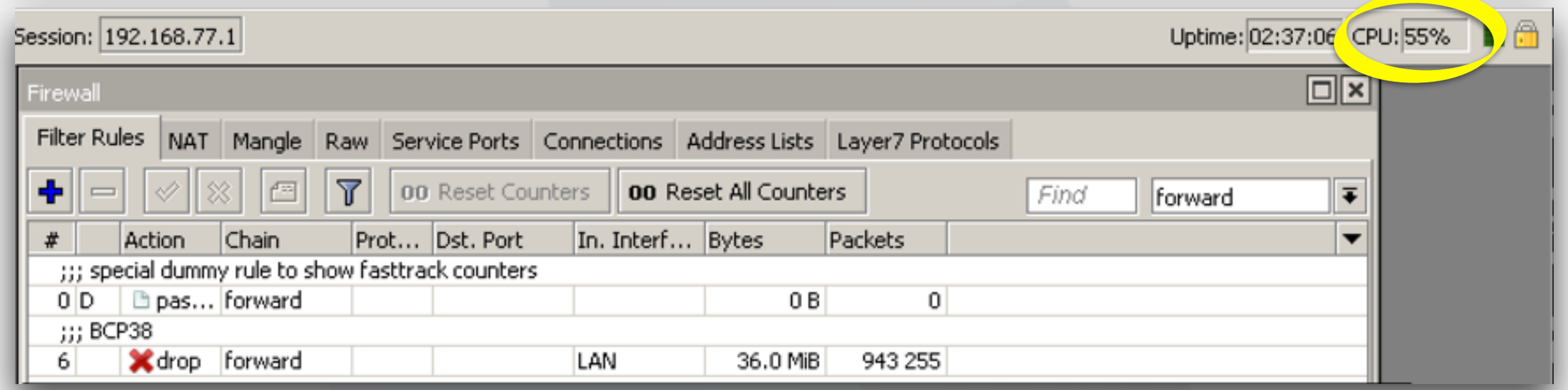
Start | Stop | Close | New Window

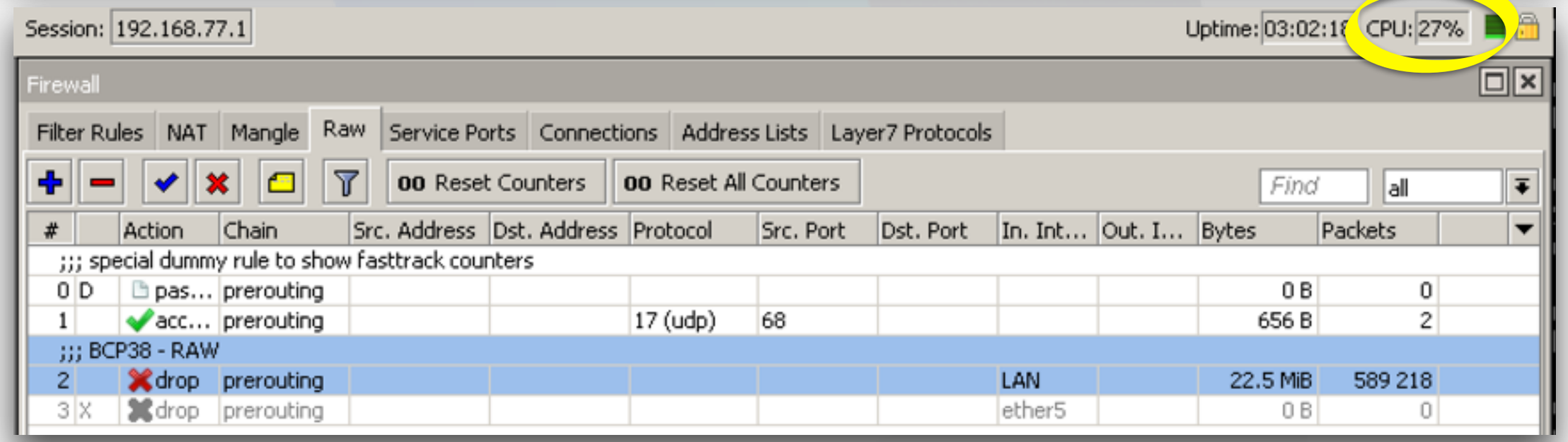
| Name | CPU | Usage |
|---|---|---|
| cpu0 | | 26.0 |
| wireless | 0 | 15.0 |
| unclassified | 0 | 5.0 |
| firewall | 0 | 3.0 |
| management | 0 | 1.5 |
| bridging | 0 | 1.0 |
| networking | 0 | 0.5 |
| profiling | 0 | 0.0 |
| queuing | 0 | 0.0 |
| winbox | 0 | 0.0 |

10 items

# Comparación Final



# Conclusión

- BCP38 no evita que se generen ataques de DoS, cuando se originan desde redes validas, ni impide que se reciban estos ataques desde la interfaz pública.

- La implementación de estas reglas significan un **aumento insignificante del CPU** de un router cuando el tráfico es normal.

- El no disponer de dichas reglas implica un **aumento considerable del CPU** cuando se produce este ataque, provocando **inconsistencias en la red, mayores latencias y reinicios del equipo.**

- ***Si todos los ISP implementaran BCP38, no existiría este ataque.***

# Bibliografía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- https://en.wikipedia.org/wiki/Ingress_filtering
- https://wiki.mikrotik.com/wiki/Manual:IP/Firewall/Raw
- https://wiki.mikrotik.com/wiki/Manual:Packet_Flow_v6
- https://en.wikipedia.org/wiki/Best_current_practice

# ¿Preguntas?

# MUCHAS GRACIAS!

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