



# BANDWIDTH

MANAGER WITH MIKROTIK 2.0





**I AM #ROOT**

**HELPING US TO FIND RIGHT PICTURES**



# ALEX VISHNYAKOV

- MIKROTIK TRAINER
- SPLYNX BILLING SOFTWARE
- BGP, OSPF, MPLS, OTHER MAGIC
- CISCO-JUNIPER-UBNT-HUAWEI
- RUSSIAN-CZECH-ENGLISH-SPANISH

Raccoon

# USED TOOLS



HARRIS

MARVEL

GUARDIAN  
OF THE GALAXY

# USED TOOLS

- MIKROTIK CHR
- VIRTUAL BOX
- EVE-NG LABS
- UBUNTU WITH SPLYNX
- MIKROTIK API





**READY ?  
LET'S START !**



# **POLICING AND SHAPING**

**CHAINS, QUEUES**





# POLITICS AND SHAKING

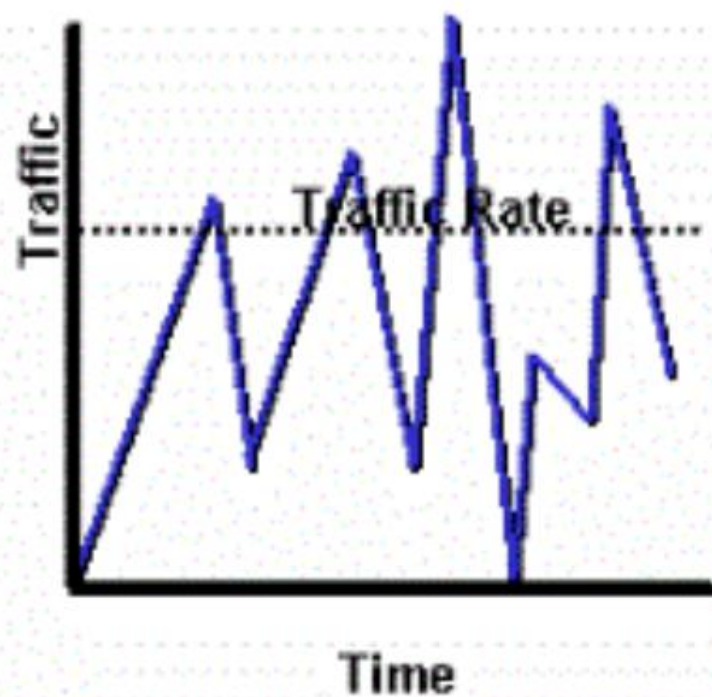
CeBIT



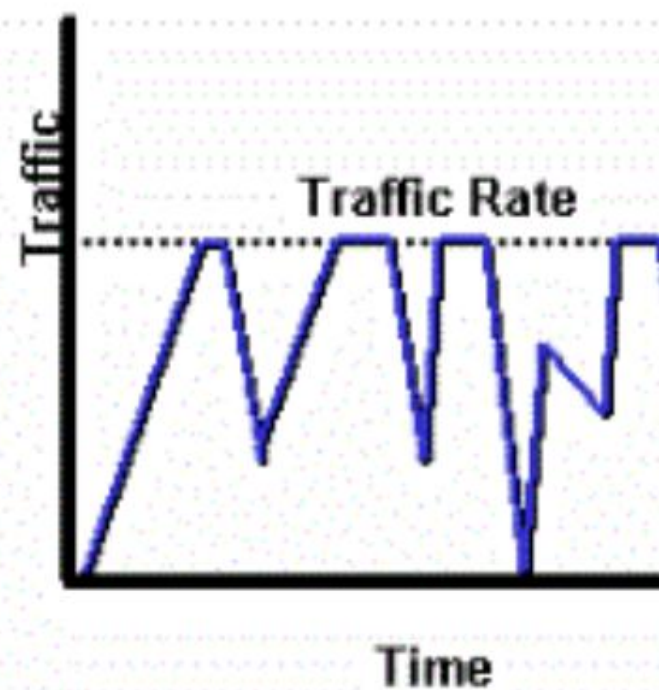
**POLITICIANS SHAKING CHAIN**



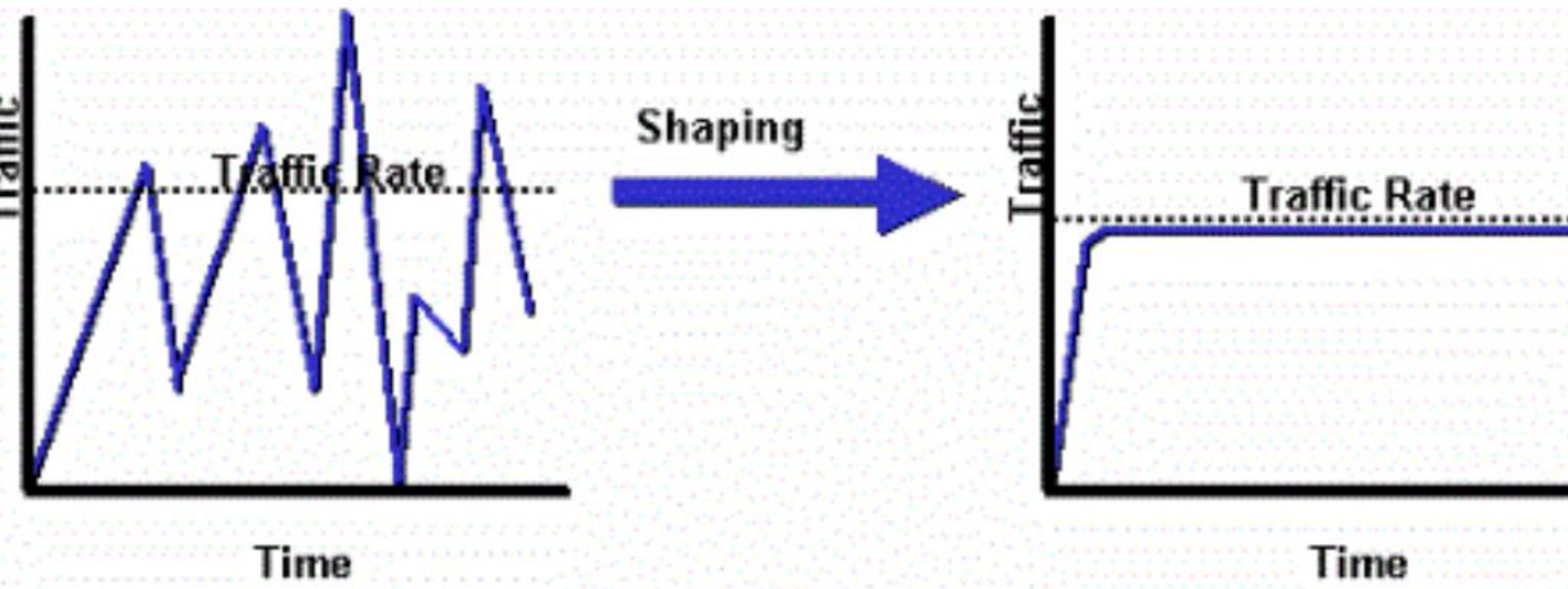
# POLICING



Policing →



# SHAPING





# POLICING

- DROP PACKETS ABOVE ALLOWED LIMIT
- QUEUE SIZE = 1
- TCP RE-ESTABLISH
- UDP PACKETS ARE LOST

PING

4

ms

DOWNLOAD

4.72

Mbps

UPLOAD

0.91

Mbps

SHARE



Result ID 7162649405

1. alexcherry@Alexs-MacBook-Pro: ~ (zsh)

```
bytes from 109.205.245.1: icmp_seq=29 ttl=55 time=16.850 ms
bytes from 109.205.245.1: icmp_seq=30 ttl=55 time=15.495 ms
bytes from 109.205.245.1: icmp_seq=31 ttl=55 time=16.115 ms
bytes from 109.205.245.1: icmp_seq=32 ttl=55 time=15.540 ms
bytes from 109.205.245.1: icmp_seq=33 ttl=55 time=15.151 ms
bytes from 109.205.245.1: icmp_seq=34 ttl=55 time=17.172 ms
request timeout for icmp_seq 35
bytes from 109.205.245.1: icmp_seq=36 ttl=55 time=15.916 ms
request timeout for icmp_seq 37
bytes from 109.205.245.1: icmp_seq=38 ttl=55 time=15.350 ms
bytes from 109.205.245.1: icmp_seq=39 ttl=55 time=15.482 ms
request timeout for icmp_seq 40
bytes from 109.205.245.1: icmp_seq=41 ttl=55 time=15.618 ms
bytes from 109.205.245.1: icmp_seq=42 ttl=55 time=15.123 ms
bytes from 109.205.245.1: icmp_seq=43 ttl=55 time=15.438 ms
```

```
109.205.245.1 ping statistics ---
35 packets transmitted, 35 packets received, 0% packet loss
round-trip min/avg/max/stddev = 15.123/15.892/20.629/1.008 ms
```

# POLICING 5 MBPS



PING

9

ms

DOWNLOAD

11.62

Mbps

UPLOAD

7.48

Mbps

SHARE



Result ID 7163338685

1. alexcherry@Alexs-MacBook-Pro: ~ (zsh)

```
4 bytes from 109.205.245.1: icmp_seq=19 ttl=56 time=14.097 ms
4 bytes from 109.205.245.1: icmp_seq=20 ttl=56 time=14.112 ms
4 bytes from 109.205.245.1: icmp_seq=21 ttl=56 time=14.074 ms
4 bytes from 109.205.245.1: icmp_seq=22 ttl=56 time=14.011 ms
4 bytes from 109.205.245.1: icmp_seq=23 ttl=56 time=14.011 ms
4 bytes from 109.205.245.1: icmp_seq=24 ttl=56 time=14.114 ms
4 bytes from 109.205.245.1: icmp_seq=25 ttl=56 time=14.162 ms
4 bytes from 109.205.245.1: icmp_seq=26 ttl=56 time=13.767 ms
4 bytes from 109.205.245.1: icmp_seq=27 ttl=56 time=13.398 ms
4 bytes from 109.205.245.1: icmp_seq=28 ttl=56 time=14.421 ms
4 bytes from 109.205.245.1: icmp_seq=29 ttl=56 time=13.403 ms
4 bytes from 109.205.245.1: icmp_seq=30 ttl=56 time=14.356 ms
4 bytes from 109.205.245.1: icmp_seq=31 ttl=56 time=14.145 ms
4 bytes from 109.205.245.1: icmp_seq=32 ttl=56 time=15.886 ms
4 bytes from 109.205.245.1: icmp_seq=33 ttl=56 time=14.926 ms
4 bytes from 109.205.245.1: icmp_seq=34 ttl=56 time=17.935 ms
4 bytes from 109.205.245.1: icmp_seq=35 ttl=56 time=14.191 ms
4 bytes from 109.205.245.1: icmp_seq=36 ttl=56 time=14.993 ms
```

**POLICING 20 MBPS**

# SHAPING

- **PACKETS PUT TO QUEUE**
- **TAKEN OUT BY CPU\***
- **PACKET ORDER IS IMPORTANT**  
**= QUEUE TYPE (FIFO, PCQ...)**
- **SET CORRECT QUEUE SIZE**



PING

3

ms

DOWNLOAD

4.81

Mbps

UPLOAD

0.85

Mbps

SHARE



Result ID [7162667707](#)

1. alexcherry@Alexs-MacBook-Pro: ~ (zsh)

```
bytes from 109.205.245.1: icmp_seq=30 ttl=55 time=17.126 ms
bytes from 109.205.245.1: icmp_seq=31 ttl=55 time=323.043 ms
bytes from 109.205.245.1: icmp_seq=32 ttl=55 time=239.366 ms
bytes from 109.205.245.1: icmp_seq=33 ttl=55 time=126.419 ms
bytes from 109.205.245.1: icmp_seq=34 ttl=55 time=164.011 ms
bytes from 109.205.245.1: icmp_seq=35 ttl=55 time=365.411 ms
bytes from 109.205.245.1: icmp_seq=36 ttl=55 time=183.146 ms
bytes from 109.205.245.1: icmp_seq=37 ttl=55 time=371.995 ms
bytes from 109.205.245.1: icmp_seq=38 ttl=55 time=504.812 ms
bytes from 109.205.245.1: icmp_seq=39 ttl=55 time=509.404 ms
bytes from 109.205.245.1: icmp_seq=40 ttl=55 time=150.161 ms
quest timeout for icmp_seq 41
bytes from 109.205.245.1: icmp_seq=42 ttl=55 time=15.339 ms
bytes from 109.205.245.1: icmp_seq=43 ttl=55 time=16.207 ms
bytes from 109.205.245.1: icmp_seq=44 ttl=55 time=15.113 ms
```

# SHAPING 5 MBPS

```
- 109.205.245.1 ping statistics ---
```

```
packets transmitted, 43 packets received, 4.4% packet loss
```

```
round-trip min/avg/max/stddev = 15.113/127.486/572.786/143.050 ms
```

**PING** **DOWNLOAD** **UPLOAD** **SHARE**

9 14.32 9.28

ms Mbps Mbps

Result ID 7163331010




```
1. alexcherry@Alexs-MacBook-Pro: ~ (zsh)
```

```
bytes from 109.205.245.1: icmp_seq=31 ttl=56 time=18.144 ms  
bytes from 109.205.245.1: icmp_seq=32 ttl=56 time=16.118 ms  
bytes from 109.205.245.1: icmp_seq=33 ttl=56 time=20.938 ms  
bytes from 109.205.245.1: icmp_seq=34 ttl=56 time=11.411 ms  
bytes from 109.205.245.1: icmp_seq=35 ttl=56 time=31.170 ms  
bytes from 109.205.245.1: icmp_seq=36 ttl=56 time=16.491 ms  
bytes from 109.205.245.1: icmp_seq=37 ttl=56 time=22.359 ms  
bytes from 109.205.245.1: icmp_seq=38 ttl=56 time=17.177 ms  
bytes from 109.205.245.1: icmp_seq=39 ttl=56 time=14.292 ms  
bytes from 109.205.245.1: icmp_seq=40 ttl=56 time=16.420 ms  
bytes from 109.205.245.1: icmp_seq=41 ttl=56 time=25.011 ms  
bytes from 109.205.245.1: icmp_seq=42 ttl=56 time=23.635 ms  
bytes from 109.205.245.1: icmp_seq=43 ttl=56 time=31.156 ms  
bytes from 109.205.245.1: icmp_seq=44 ttl=56 time=14.826 ms  
bytes from 109.205.245.1: icmp_seq=45 ttl=56 time=16.882 ms  
bytes from 109.205.245.1: icmp_seq=46 ttl=56 time=14.143 ms  
bytes from 109.205.245.1: icmp_seq=47 ttl=56 time=14.191 ms
```

# SHAPING 20 MBPS





## DEFAULT SMALL (PPPOE)



 **PING**       **DOWNLOAD**       **UPLOAD**      **SHARE**

**8**      **19.15**      **9.76**

ms      Mbps      Mbps

Result ID **7163336308**

```
1. alexcherry@Alexs-MacBook-Pro: ~ (zsh)
4 bytes from 109.205.245.1: icmp_seq=23 ttl=56 time=68.823 ms
4 bytes from 109.205.245.1: icmp_seq=24 ttl=56 time=16.443 ms
4 bytes from 109.205.245.1: icmp_seq=25 ttl=56 time=55.966 ms
4 bytes from 109.205.245.1: icmp_seq=26 ttl=56 time=41.115 ms
4 bytes from 109.205.245.1: icmp_seq=27 ttl=56 time=37.449 ms
4 bytes from 109.205.245.1: icmp_seq=28 ttl=56 time=58.169 ms
4 bytes from 109.205.245.1: icmp_seq=29 ttl=56 time=71.563 ms
4 bytes from 109.205.245.1: icmp_seq=30 ttl=56 time=41.212 ms
4 bytes from 109.205.245.1: icmp_seq=31 ttl=56 time=43.749 ms
4 bytes from 109.205.245.1: icmp_seq=32 ttl=56 time=45.261 ms
4 bytes from 109.205.245.1: icmp_seq=33 ttl=56 time=72.241 ms
4 bytes from 109.205.245.1: icmp_seq=34 ttl=56 time=68.991 ms
4 bytes from 109.205.245.1: icmp_seq=35 ttl=56 time=72.967 ms
4 bytes from 109.205.245.1: icmp_seq=36 ttl=56 time=63.182 ms
4 bytes from 109.205.245.1: icmp_seq=37 ttl=56 time=46.526 ms
4 bytes from 109.205.245.1: icmp_seq=38 ttl=56 time=14.470 ms
4 bytes from 109.205.245.1: icmp_seq=39 ttl=56 time=14.332 ms
4 bytes from 109.205.245.1: icmp_seq=40 ttl=56 time=18.208 ms
```

**SHAPING 20 MBPS FIXED**  
**SET QUEUE SIZE = 50 PACKETS**



# SHAPING

QUEUES, HTB, PCQ



# WHAT TO MANAGE

- **LIMIT CUSTOMER'S SPEED**
- **ALLOCATE BANDWIDTH TO APPLICATIONS**
- **PRIORITY FOR TYPE OF TRAFFIC**



**IT'S ALL ABOUT QUEUES**



# MIKROTIK SHAPING



**1. QUEUE TREE**

**2. Q.TREE : PCQ + ADD.LIST**

**3. SIMPLE QUEUE**

**4. SIMPLE QUEUE +  
PARENTS**

A small, brown, tree-like creature with a smiling face and large eyes, standing in a white pot. The creature has a thick, gnarled trunk and a head with many small, leaf-like branches. It is positioned in the center of the image, with its arms slightly raised. A dark gray horizontal band is overlaid across the middle of the image, containing the text "1. CUTE TREE" in white, bold, sans-serif font.

# 1. CUTE TREE

# 1. QUEUE TREE



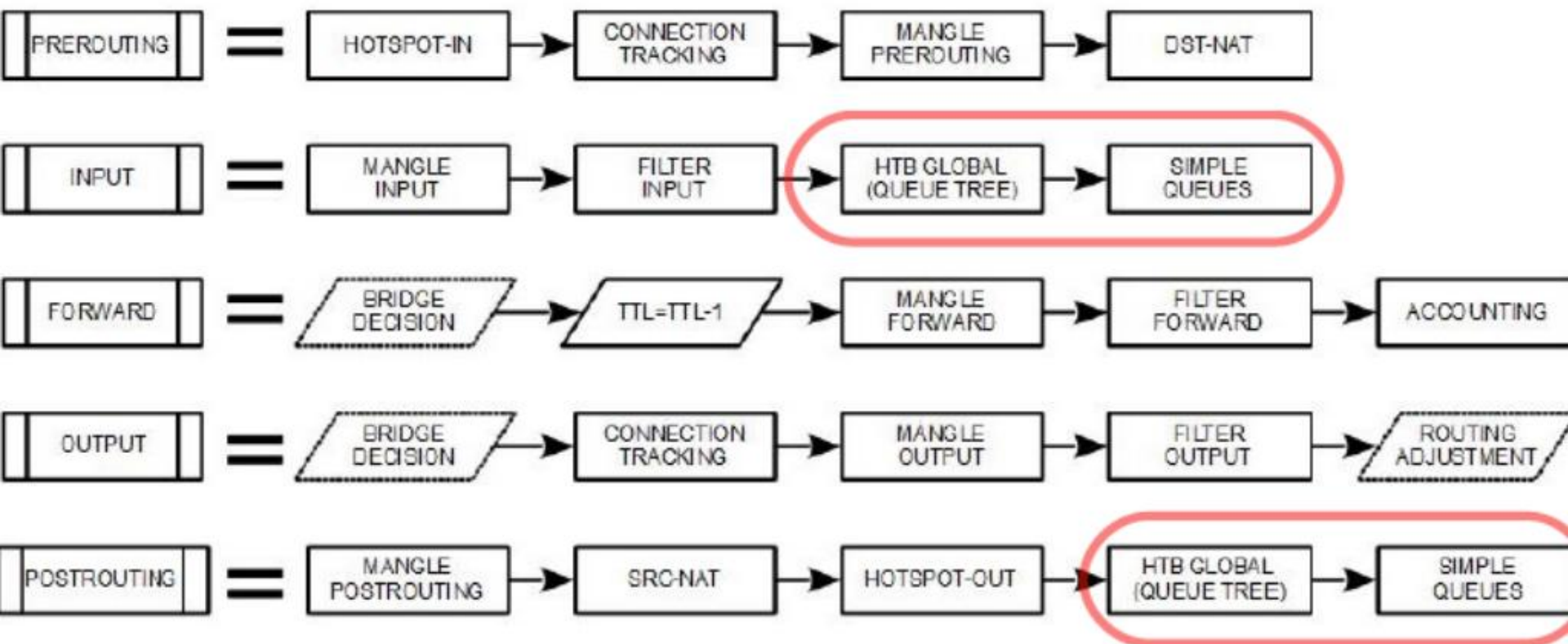


# 1. QUEUE TREE

- NEED TO MANGLE ALL (SLOW)
- TREE WITH MULTIPLE LEVELS
- USE IT FOR TRAFFIC TYPE PRIORITISATION
- HTB GLOBAL IS USED FOR QUEUES

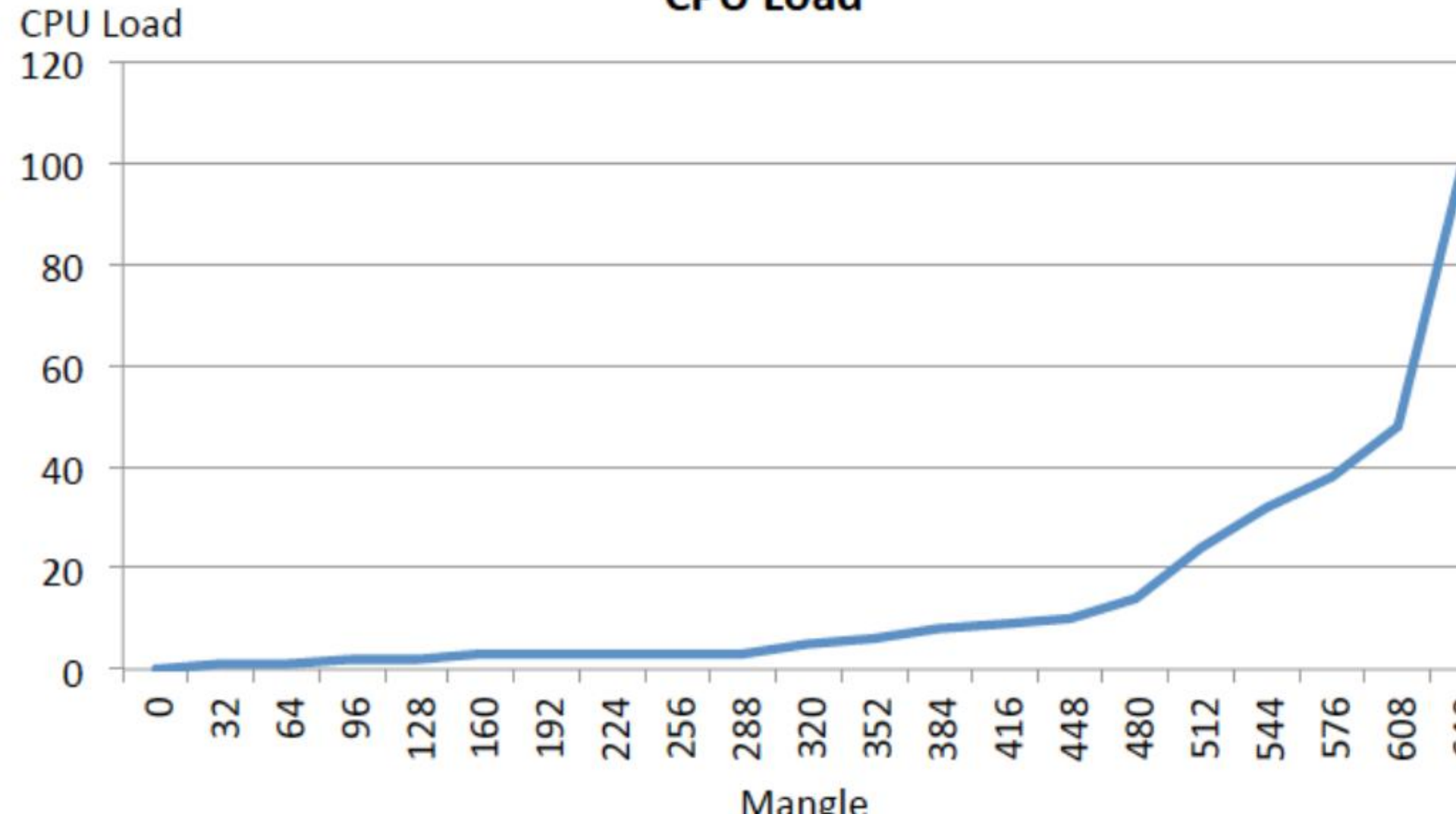


# HTB in RouterOS v6



# Graphs

## CPU Load





# 640 mangles → 100% CPU load

Memory: 3561.8 MB Uptime: 19:34:5 CPU: 100% Hide Passwords

| Name         | Tx         | Rx         | Tx Pac... | Rx Pac... | Tx Dro... |
|--------------|------------|------------|-----------|-----------|-----------|
| ether6       | 178.0 Mbps | 176.2 Mbps | 40 451    | 40 022    |           |
| ether1       | 176.2 Mbps | 178.1 Mbps | 40 023    | 40 453    |           |
| bridge-re... | 713.3 kbps | 36.6 kbps  | 68        | 76        |           |
| ether12      | 666.0 kbps | 55.4 kbps  | 65        | 90        |           |
| ether11      | 15.5 kbps  | 31.3 kbps  | 27        | 3         |           |
| ether10      | 15.0 kbps  | 22.3 kbps  | 26        | 2         |           |
| ether2       | 0 bps      | 0 bps      | 0         | 0         |           |
| ether3       | 0 bps      | 0 bps      | 0         | 0         |           |
| ether4       | 0 bps      | 0 bps      | 0         | 0         |           |
| ether5       | 0 bps      | 0 bps      | 0         | 0         |           |
| ether7       | 0 bps      | 0 bps      | 0         | 0         |           |
| ether8       | 0 bps      | 0 bps      | 0         | 0         |           |
| ether9       | 0 bps      | 0 bps      | 0         | 0         |           |
| sfpl         | 0 bps      | 0 bps      | 0         | 0         |           |
| sfp2         | 0 bps      | 0 bps      | 0         | 0         |           |
| sfpc         | 0 bps      | 0 bps      | 0         | 0         |           |

| Name        | Parent | Packet... | Limit At (...) | Max Limit... | Avg. R... | Queued Bytes |
|-------------|--------|-----------|----------------|--------------|-----------|--------------|
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |
| queue-ds... | global | packet... |                | 20M          | 0 bps     | 0            |

| CPU   | Load ... | IRQ (%) |
|-------|----------|---------|
| cpu0  | 100      | 99      |
| cpu1  | 100      | 99      |
| cpu2  | 100      | 100     |
| cpu3  | 100      | 96      |
| cpu4  | 100      | 100     |
| cpu5  | 100      | 100     |
| cpu6  | 100      | 100     |
| cpu7  | 100      | 100     |
| cpu8  | 100      | 100     |
| cpu9  | 100      | 100     |
| cpu10 | 100      | 100     |
| cpu11 | 100      | 100     |
| cpu12 | 100      | 99      |
| cpu13 | 100      | 100     |
| cpu14 | 100      | 100     |
| cpu15 | 100      | 100     |
| cpu16 | 100      | 100     |
| cpu17 | 100      | 100     |
| cpu18 | 100      | 100     |
| cpu19 | 100      | 100     |
| cpu20 | 100      | 99      |
| cpu21 | 100      | 100     |
| cpu22 | 100      | 100     |
| cpu23 | 100      | 99      |
| cpu24 | 100      | 100     |
| cpu25 | 100      | 100     |
| cpu26 | 100      | 100     |
| cpu27 | 100      | 100     |
| cpu28 | 100      | 100     |
| cpu29 | 100      | 100     |
| cpu30 | 100      | 95      |
| cpu31 | 100      | 99      |
| cpu32 | 100      | 100     |
| cpu33 | 100      | 100     |
| cpu34 | 100      | 97      |
| cpu35 | 100      | 100     |

| Action | Chain       | Src. Address | Dst. Address | Prot... | Src. Port | Dst. Port | In. Int... | Out... |
|--------|-------------|--------------|--------------|---------|-----------|-----------|------------|--------|
| ma...  | pre-routing |              | 172.16.0.68  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.67  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.67  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.66  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.66  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.65  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.65  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.64  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.64  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.63  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.63  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.62  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.62  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.61  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.61  |         |           |           |            |        |
| ma...  | pre-routing | 172.16.0.60  |              |         |           |           |            |        |
| ma...  | pre-routing |              | 172.16.0.60  |         |           |           |            |        |

| Name          | Usage |
|---------------|-------|
| bridging      | 0.0   |
| firewall      | 95.4  |
| flash         | 0.0   |
| idle          | 0.0   |
| management    | 0.1   |
| networking    | 3.8   |
| profiling     | 0.3   |
| routing       | 0.0   |
| undclassified | 0.0   |
| winbox        | 0.0   |

A close-up shot of Groot, the tree-like character from Guardians of the Galaxy. He is looking down at a control panel with several buttons and levers. The background is a dark, blue, out-of-focus space. The word "SHOWTIME" is overlaid in large, white, bold, sans-serif capital letters across the middle of the image.

**SHOWTIME**



A promotional image for the movie Guardians of the Galaxy. Rocket Raccoon is on the left, holding a large, futuristic blaster. Groot is on the right, with his mouth wide open in a shout. The background is a blurred, futuristic cityscape.

## 2. PCQ + ADDRESS LIST

IMPROVED QUEUE TREE



## **2. PCQ + ADDRESS LIST**

- **REALLY LESS MANGLES**
- **INTERNAL PCQ SUB QUEUES**
- **FAST ON X86 WITH POWERFUL CORES**
- **USED A LOT IN ROUTER OS 5.X**
- **FOR CCR NOT A GOOD OPTION**

## **2. CCR LIMITATION :**

- **ONLY ONE CPU CORE CAN TAKE PACKETS OUT FROM HTB TREE**
- **MIKROTIK IS WORKING ON POSSIBLE UPDATE OF HTB ALGORITHM, OR INTRODUCING COMPLETELY NEW METHOD (V 7.0 ?)**
- **USE INTERFACE HTB AS MUCH AS POSSIBLE TO OFFLOAD TRAFFIC FROM HTB "GLOBAL" OR ... -> USE SIMPLE QUEUES**



A close-up shot of Groot, the tree-like character from Guardians of the Galaxy. He is looking directly at the camera with a wide-eyed, curious expression. His body is made of textured, brown bark with some green moss or lichen on top. He is holding onto a dark, curved object, possibly a part of a ship's structure. The background is a bright, glowing orange and yellow, suggesting a fiery or high-energy environment. The word "SHOWTIME" is overlaid in large, white, bold, sans-serif capital letters across the center of the image.

**SHOWTIME**



A full-body image of Drax the Destroyer from the movie Guardians of the Galaxy. He is a muscular, bald man with extensive orange and red tribal-style tattoos covering his face and torso. He is wearing blue tactical pants with a black belt. He stands with his arms crossed against a plain white background.

# 3. SIMPLE QUEUE

# 3. SIMPLE QUEUE

- **STILL SEQUENTIAL IN 6.X**
- **MATCHING ALGORITHM UPDATED**
- **VERY FAST IN CCR AND 6.X**
- **MULTIPLE CORE SUPPORT**
- **CAN BE USED WITH RADIUS**

# 3. SIMPLE QUEUE RADIUS

- **AUTOMATIC CREATION**
- **RADIUS ATTRIBUTES USED**
- **ALLOWS TO CHANGE SPEEDS ON FLY (COA SUPPORT)**
- **ALLOWS CAP AND FUP IMPLEMENTATION**





Queue List

Simple Queues | Interface Queues | Queue Tree | Queue Types

Find

| #          | Name            | Target      | Upload Max Limit | Download Max Limit | Packet Marks | Total Max Limit (b... |
|------------|-----------------|-------------|------------------|--------------------|--------------|-----------------------|
| ;;; 221092 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3949-5068 | 10.25.5.86  | 720k             | 920k               |              |                       |
| ;;; 221091 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3945-4972 | 10.25.5.85  | 720k             | 920k               |              |                       |
| ;;; 245634 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3944-4930 | 10.26.0.10  | 720k             | 920k               |              |                       |
| ;;; 003937 |                 |             |                  |                    |              |                       |
| 996        | SpL5Q_3938-4906 | 10.25.6.144 | 720k             | 920k               |              |                       |
| ;;; 251631 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3926-5401 | 10.25.1.159 | 920k             | 1520k              |              |                       |
| ;;; 003924 |                 |             |                  |                    |              |                       |
| 984        | SpL5Q_3924-4828 | 10.25.5.84  | 720k             | 920k               |              |                       |
| ;;; 251630 |                 |             |                  |                    |              |                       |
| 983        | SpL5Q_3923-4827 | 10.25.1.97  | 720k             | 920k               |              |                       |
| ;;; 251629 |                 |             |                  |                    |              |                       |
| 981        | SpL5Q_3922-4824 | 10.25.1.90  | 720k             | 920k               |              |                       |
| ;;; 265858 |                 |             |                  |                    |              |                       |
| 973        | SpL5Q_3920-4815 | 10.25.6.14  | 720k             | 920k               |              |                       |
| ;;; 003919 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3919-4983 | 10.25.5.50  | 720k             | 920k               |              |                       |
| ;;; 003917 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3917-5043 | 10.26.0.212 | 2048k            | 2048k              |              |                       |
| ;;; 002302 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3913-5501 | 10.25.1.206 | 1024k            | 1024k              |              |                       |
| ;;; 003911 |                 |             |                  |                    |              |                       |
| 1...       | SpL5Q_3911-4962 | 10.26.0.211 | 920k             | 1520k              |              |                       |
| ;;; 003908 |                 |             |                  |                    |              |                       |
| 958        | SpL5Q_3908-4753 | 10.25.7.177 | 360k             | 460k               |              |                       |
| ;;; 003907 |                 |             |                  |                    |              |                       |
| 956        | SpL5Q_3907-4750 | 10.25.7.176 | 360k             | 460k               |              |                       |
| ;;; 003903 |                 |             |                  |                    |              |                       |
| 948        | SpL5Q_3904-4733 | 10.26.0.207 | 360k             | 460k               |              |                       |
| ;;; 003901 |                 |             |                  |                    |              |                       |
| 939        | SpL5Q_3901-4570 | 10.26.0.210 | 360k             | 460k               |              |                       |
| ;;; 251628 |                 |             |                  |                    |              |                       |
| 934        | SpL5Q_3898-4561 | 10.25.1.103 | 720k             | 920k               |              |                       |

2251 items (1 selected)

0 B queued

0 packets queued

Profile (Running)

| Name               | Usage |
|--------------------|-------|
| idle               | 64.9  |
| firewall           | 17.0  |
| queuing            | 10.5  |
| networking         | 3.2   |
| traffic-accounting | 0.9   |
| management         | 0.8   |
| ethernet           | 0.5   |
| bridging           | 0.4   |
| ppp                | 0.3   |
| profiling          | 0.2   |
| radius             | 0.2   |
| routing            | 0.2   |
| unclassified       | 0.2   |
| firewall-mgmt      | 0.0   |
| logging            | 0.0   |
| winbox             | 0.0   |

# 300 MBPS, 2K QUEUES

Resources

|                 |            |
|-----------------|------------|
| Free Memory:    | 15.0 GiB   |
| Total Memory:   | 15.9 GiB   |
| CPU:            | tilegx     |
| CPU Count:      | 36         |
| CPU Frequency:  | 1200 MHz   |
| CPU Load:       | 12 %       |
| Free HDD Space: | 876.4 MiB  |
| Total HDD Size: | 1024.0 MiB |

# 3. SIMPLE QUEUE

- CCR 1036 IN PRODUCTION :
- 1400 PPPOE SESSIONS/QUEUES
- 1.2 DOWN/0,8 UP GBPS
- 80-90% CPU USAGE
- RADIUS CREATED QUEUES



# 3. SIMPLE QUEUE

- CCR 1072 IN PRODUCTION :
- UP TO 3000 PPPOE AND QUEUES
- 2,5 DOWN / 1,5 UP GBPS
- 80-90% CPU USAGE
- RADIUS CREATED QUEUES

Location:

All

Partn

# 3. SIMPLE QUEUE - DEPLOYMENT

## Routers

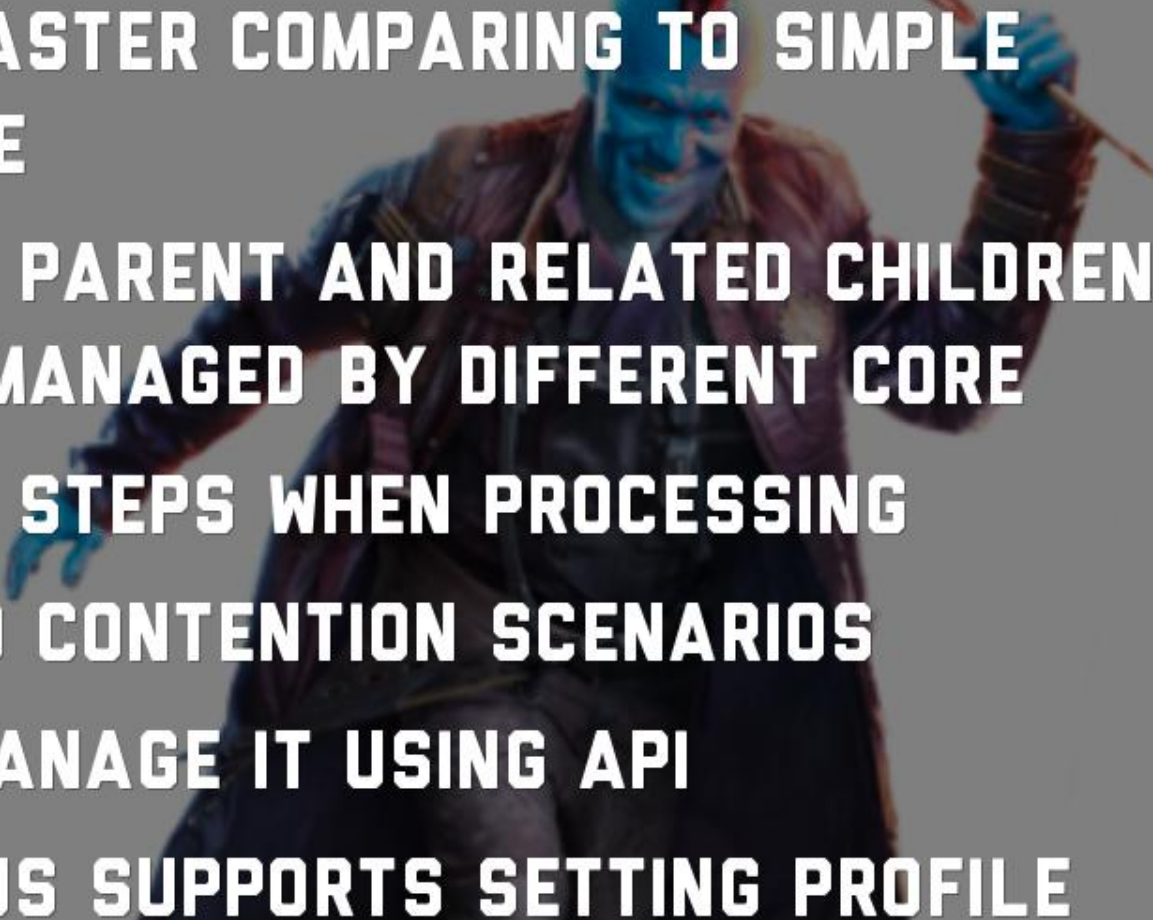
|  | Producer/Model |  | Status |  | Customers online |
|--|----------------|--|--------|--|------------------|
|  | 1036-8G-2S+-EM |  | Radius |  | 1101             |
|  | 1036-8G-2S+-EM |  | Radius |  | 1066             |
|  | 1036-8G-2S+-EM |  | Radius |  | 1065             |
|  | 1036-8G-2S+-EM |  | Radius |  | 1059             |
|  | 1036-8G-2S+-EM |  | Radius |  | 986              |
|  | CCR1072-1G-8S+ |  | Radius |  | 0                |

A full-page background image of the character Star-Lord from the movie Guardians of the Galaxy. He is shown from the waist up, wearing his signature red leather jacket and blue pants. He has a confident, slightly mischievous expression, with a small red and white feather sticking out of his forehead. He is holding a golden dartslinger in his right hand, with a dart pointed towards the viewer. The background is a plain, light color.

# **4. SIMPLE QUEUE WITH PARENT FASTEST SHAPING ON CCR**



# 4. SIMPLE QUEUE WITH PARENT

- 9X FASTER COMPARING TO SIMPLE QUEUE
  - EACH PARENT AND RELATED CHILDREN ARE MANAGED BY DIFFERENT CORE
  - LESS STEPS WHEN PROCESSING
  - BUILD CONTENTION SCENARIOS
  - WE MANAGE IT USING API
  - RADIUS SUPPORTS SETTING PROFILE
- 

# CONTENTION PER PLAN

- 5 MBPS PLAN 1:5 CONTENTION
- DEFINE LIMIT-AT (1024 KBPS)
- CENTRAL SHAPING
- MAX. 128 IPS UNDER ONE PARENT

# **CONTENTION PER SECTOR**

- **DEFINE SECTOR MAX SPEEDS**
- **PUT CUSTOMERS UNDER SECTORS**
- **10 MBPS SECTOR WITH 5 CUSTOMERS**
- **EACH CUSTOMER CAN HAVE DIFFERENT SPEED**



A close-up shot of Baby Groot from the movie Guardians of the Galaxy. He is standing on a reflective surface, looking slightly to the right with a neutral expression. His arms are raised, and his body is covered in textured, brown bark. The background is a blurred mix of warm orange and yellow lights on the left and cool green and blue lights on the right.

**SHOWTIME**

# QOS AND ROUTEROS

**OVERLOADED ?**





A man in a flight suit is looking out of a window. The background is a blue-tinted, futuristic environment with curved lines and a glowing red and blue pattern. The text is overlaid on the image.

**WHERE TO SET QOS (L7, TCP/UDP) ?**

**1. ON CENTRAL NAS**

**2. ON ACCESS POINT**

**3. ON CPE**

# **WHERE TO SET QOS ?**

- 1. CENTRAL NAS NEEDS MAIN PARENT WITH MAX LIMIT**
- 2. ACCESS POINTS WE USE IN BRIDGE MODE, PERFORMANCE**
- 3. WE CHOOSE QOS ON CPE**



# WHERE TO SET USER SHAPING ?

- WE RECOMMEND AUTOMATIC AND CENTRAL APPROACH
- PPPOE SERVERS
- IPOE, DHCP DEFAULT GW
- CAN BE ON ACCESS POINTS



**THAT'S ALL !**



# THANK YOU

- FOR YOUR TIME
- MIKROTIK FOR ROUTEROS
- VALENS RIYADI FOR FEW SLIDES
- #ROOT FOR PICTURES :-)

# CONTACTS

- **ALEX@SPLYNX.COM**
- **SPLYNX.COM**
- **ISP-SERVIS.COM**
- **FACEBOOK AND TWITTER :**  
**ISPFRAFRAMEWORK**



**QUESTIONS ?**

