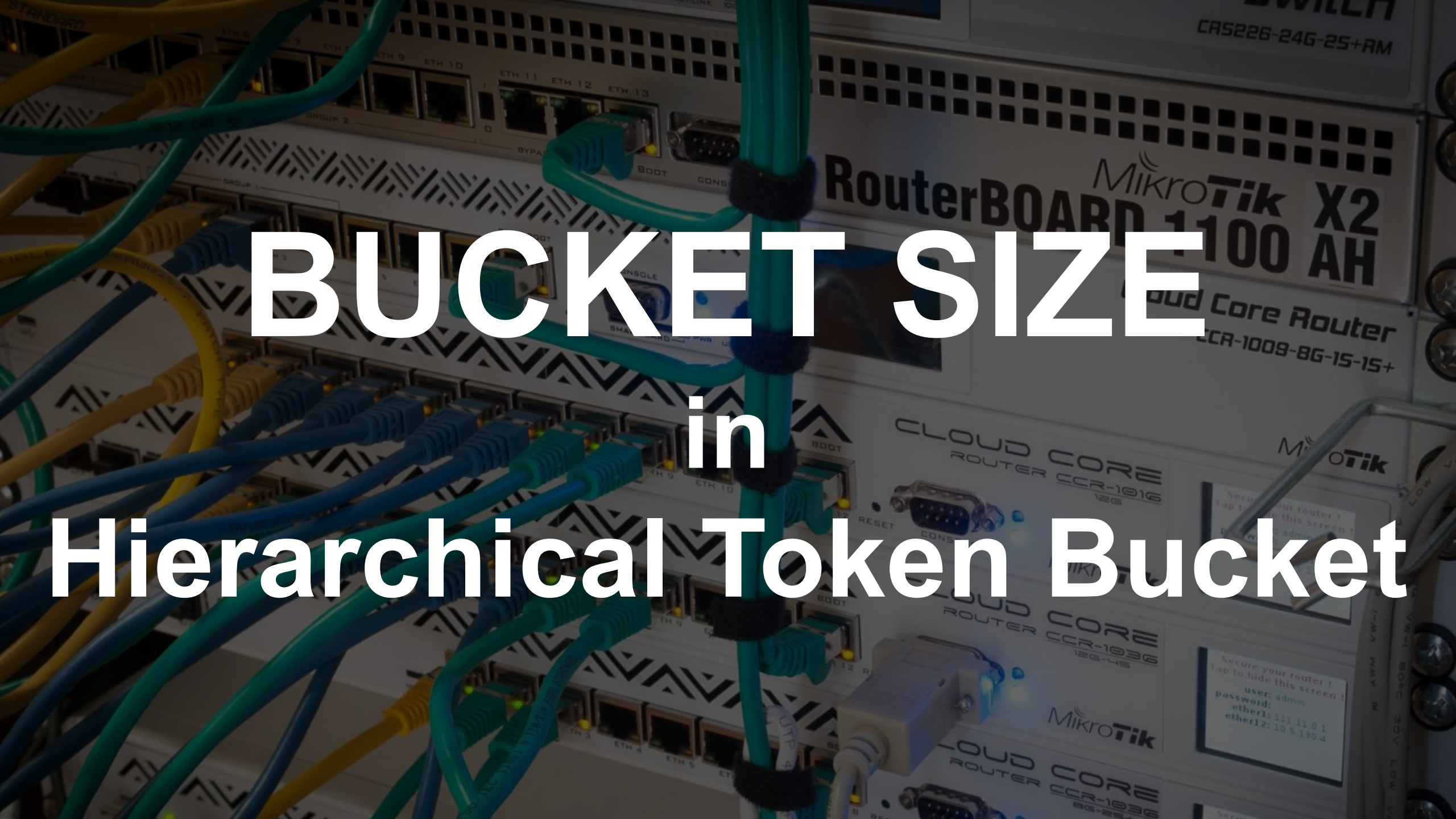

MikroTik
MUM Indonesia 2017
Yogyakarta, 27-28 Oct



BUCKET SIZE in Hierarchical Token Bucket

Ahmad Rosid Komarudin

Experience

- SMK IDN Madinatul Ilmi
- ID-Networkers

Certification

- MTCNA, MTCRE, MTCWE, MTCUME, MTCINE
- Mikrotik Certified Trainer
- Others Certificate

SMK Negeri 1 Nglegok

Pesantren IDN

About ID-Networkers

Rofiq Fauzi, Oky Tria Saputra, Ikhwanul Kurnia Rahman, Farras Afif Perdana, Untung Wahyudi, Ahmad Rosid / ID-Networkers

Rating: 4.9/5 (1424 votes)

Average student result: 69%

MTCNA, MTCRE, MTCWE, MTCTCE, MTCUME, MTCINE, MTCIPv6E

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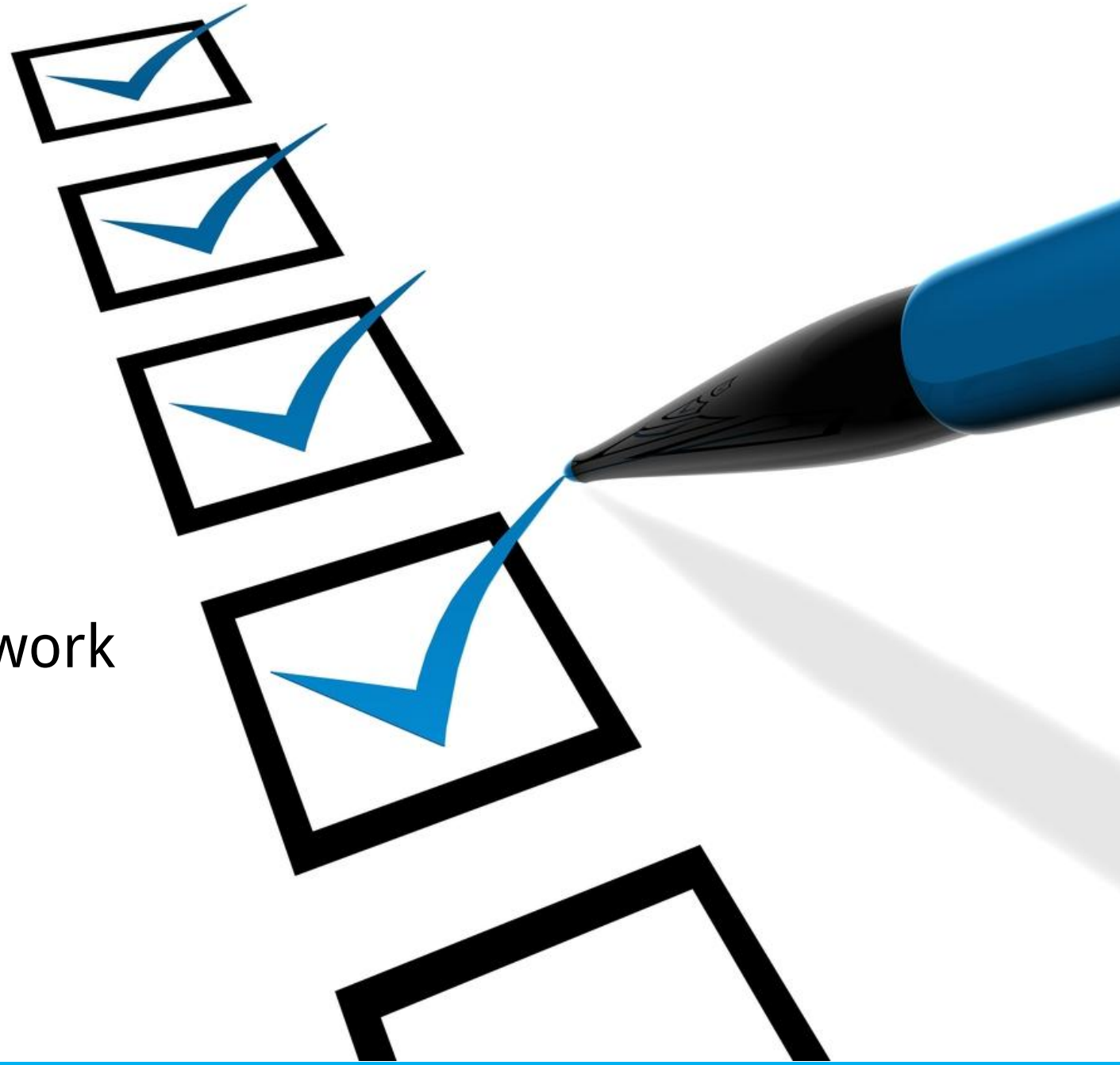
About IDNFoundation.org

Objective

- Traffic shaping?
- Hierarchical Token Bucket
- Hirarchical in HTB
- Bucket Size in HTB
- Bucket Size in Hotspot Network
- Bucket Size vs Burst



Traffic Shaping?

Usage without shaping.

Traffic Shaping?

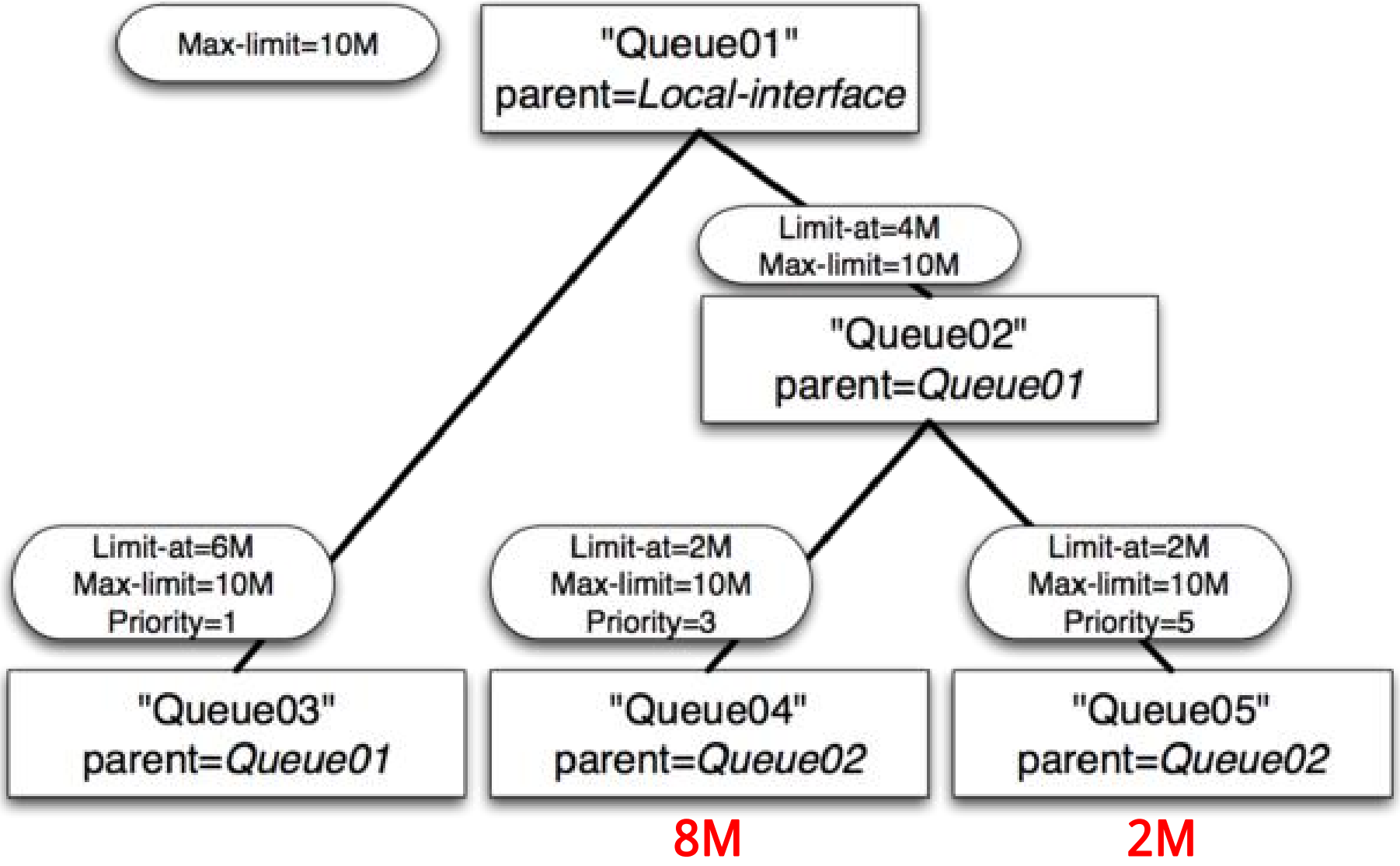
Usage with shaping.

Hierarchical Token Bucket

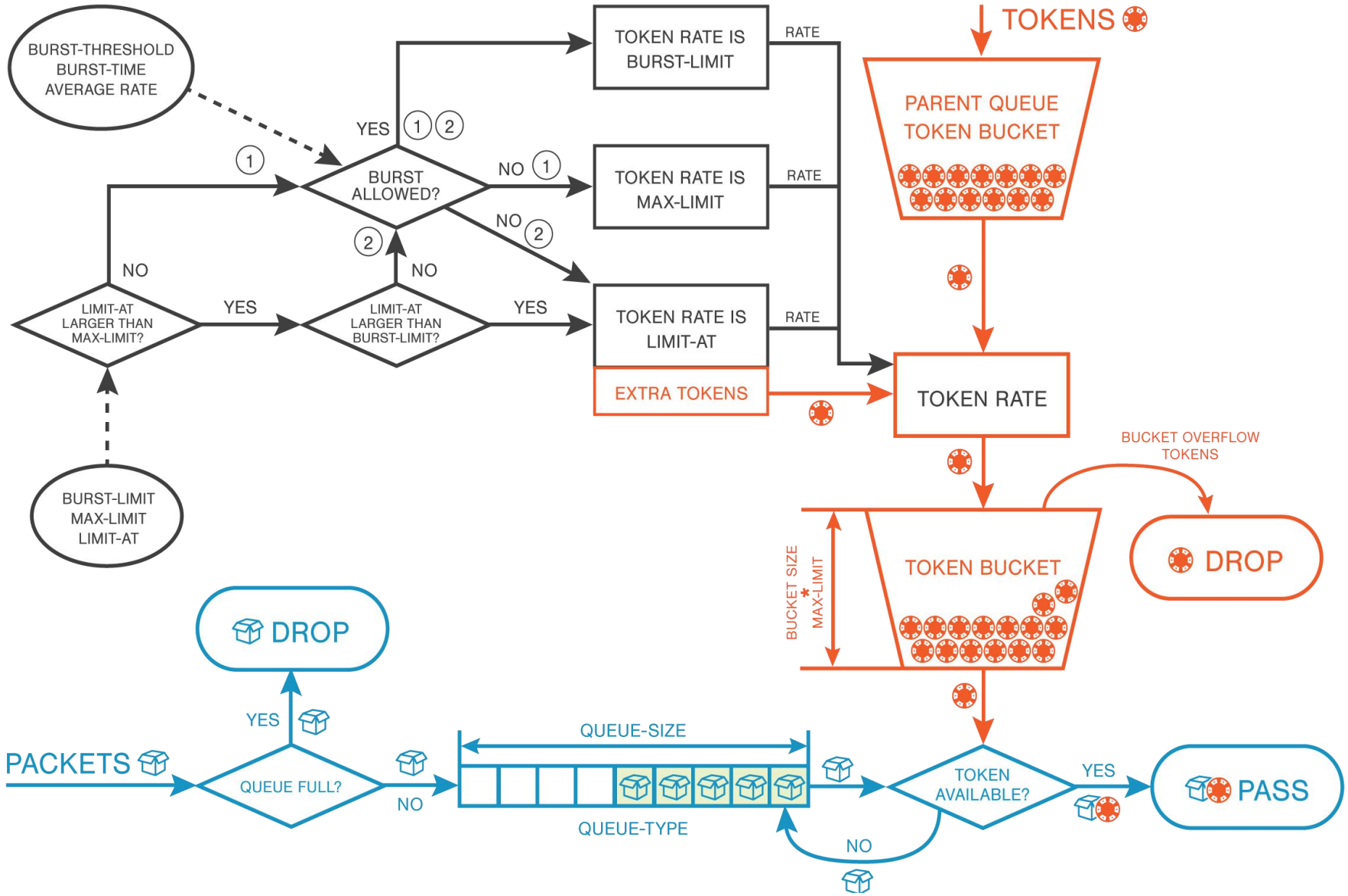
- All quality of service implementation in RouterOS is based on Hierarchical Token Bucket
- HTB allows to create hierarchical queue structure and determine relations between parent and child queues and relation between child queues
- Now, HTB allows us to manipulate bucket size parameter

Hierarchical

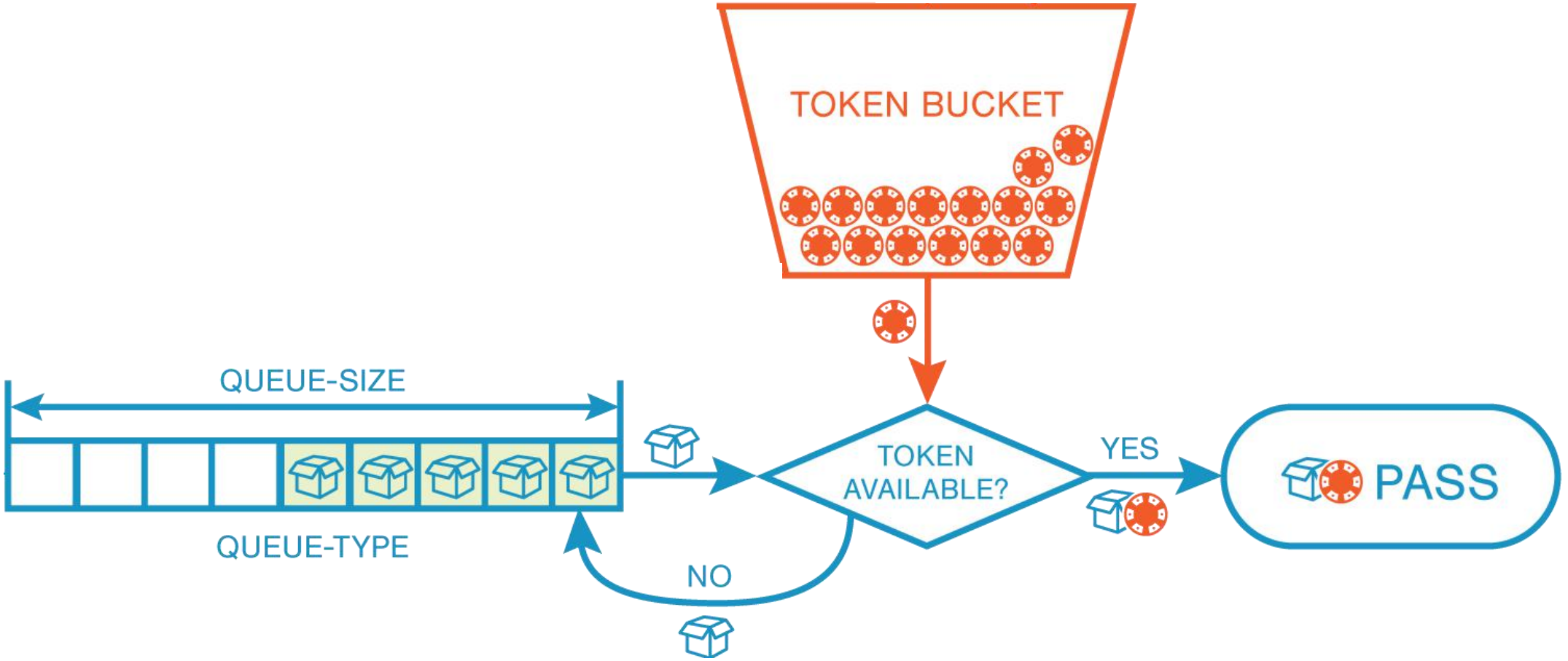
Hierarchical



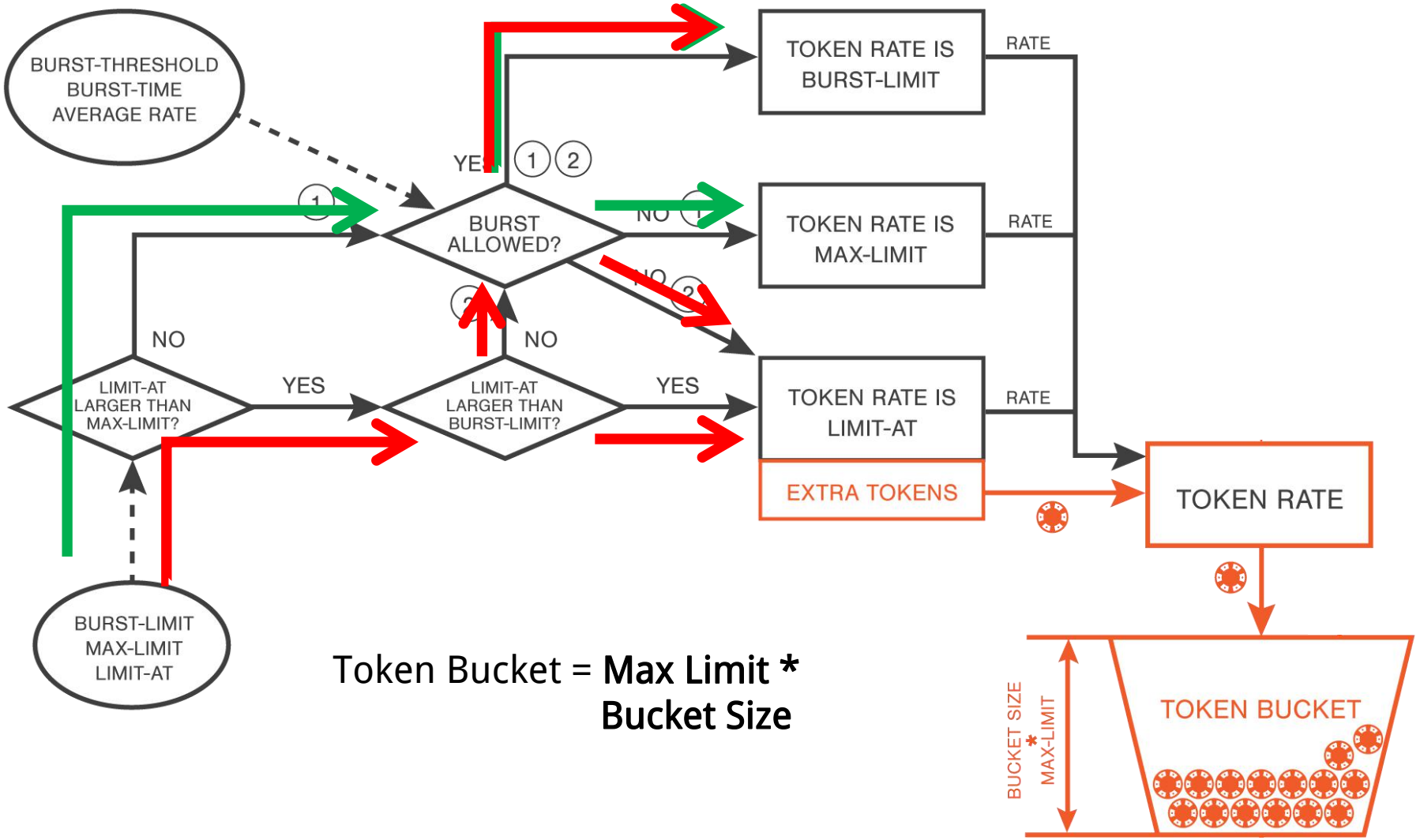
Token Bucket Algorithm



Token Bucket Algorithm

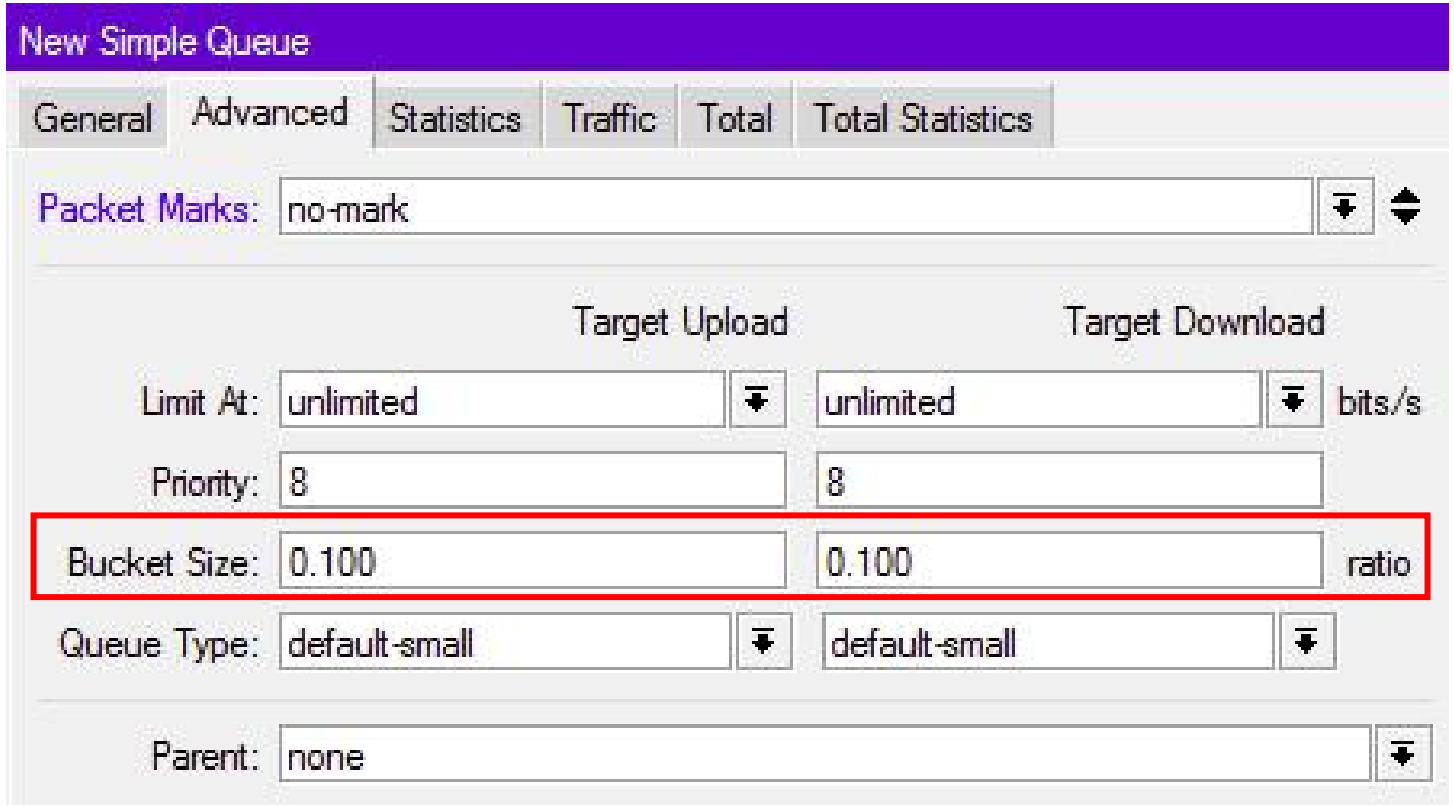


Token Bucket Capacity



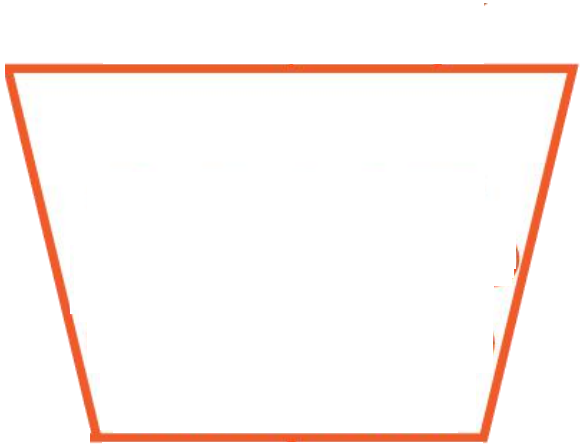
Token Bucket = **Max Limit * Bucket Size**

Bucket size

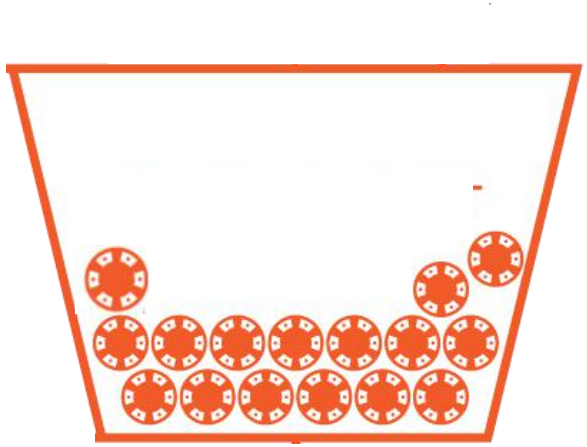


Applies to RouterOS: v6.35+

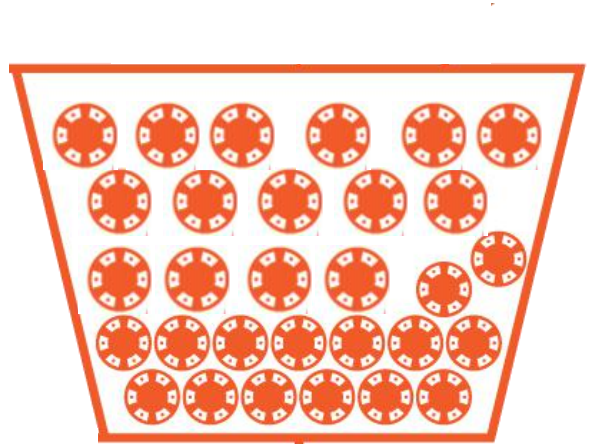
The Rule



Packet not sent



Normal Trafic



Get additional bandwidth

Example Case

- **max-limit=512K , bucket-size=10**
- bucket capacity = 5M (512K * 10)
- 5Mb without limitation
- client use 1Mbps -> get 10 second
- client use 2Mbps -> get 4 second

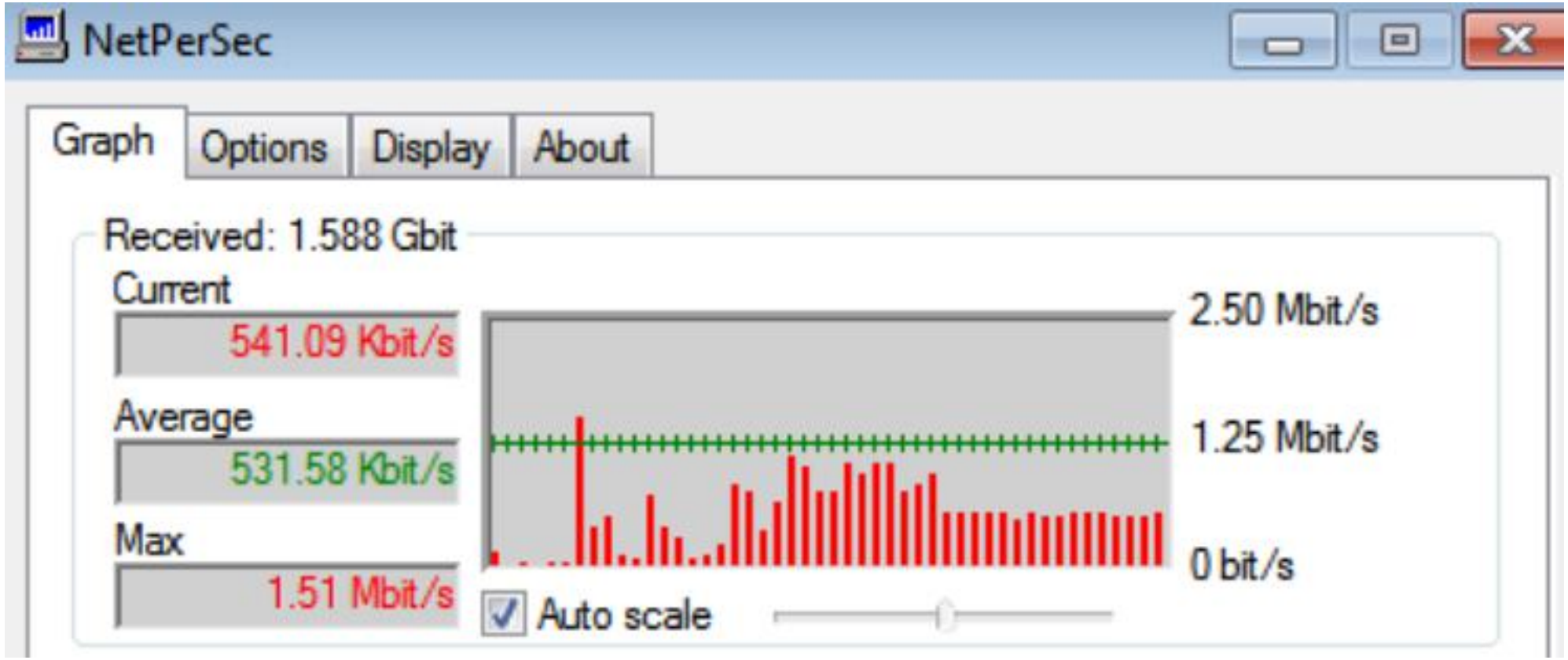
Kalkulasi bucket capacity

- max-limit = 512K
- bucket capacity = 5M
- Trafic yang digunakan 1Mbps

Detik ke-	Max-limit	bucket	sisa bucket
1	512K	512K	4.5M
2	512K	512K	4M
3	512K	512K	3.5M
4	512K	512K	3M
5	512K	512K	2.5M
6	512K	512K	2M
7	512K	512K	1.5M
8	512K	512K	1Mb
9	512K	512K	512K
10	512K	512K	0
11	512K		

POC

- Client menggunakan 1 Mb



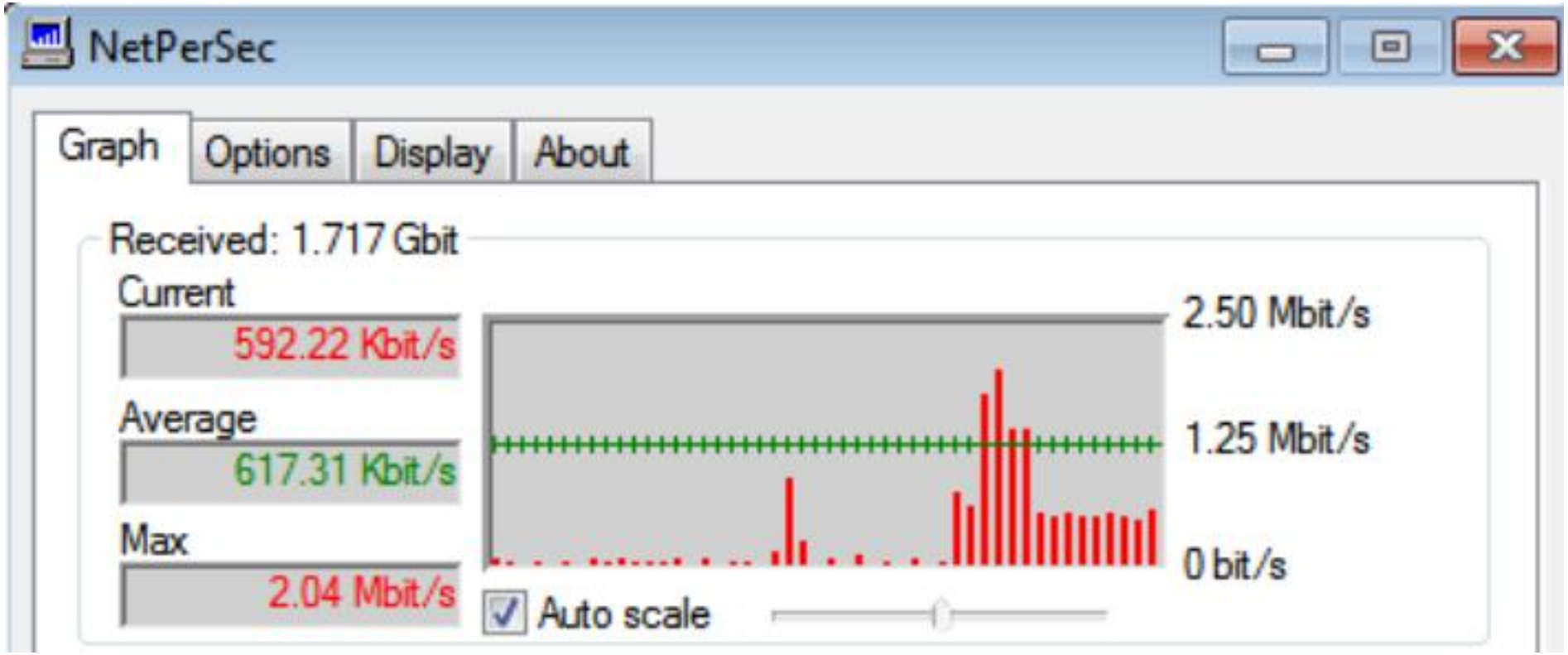
Kalkulasi bucket capacity

- max-limit = 512K
- bucket capacity = 5M
- Trafic yang digunakan 2Mbps

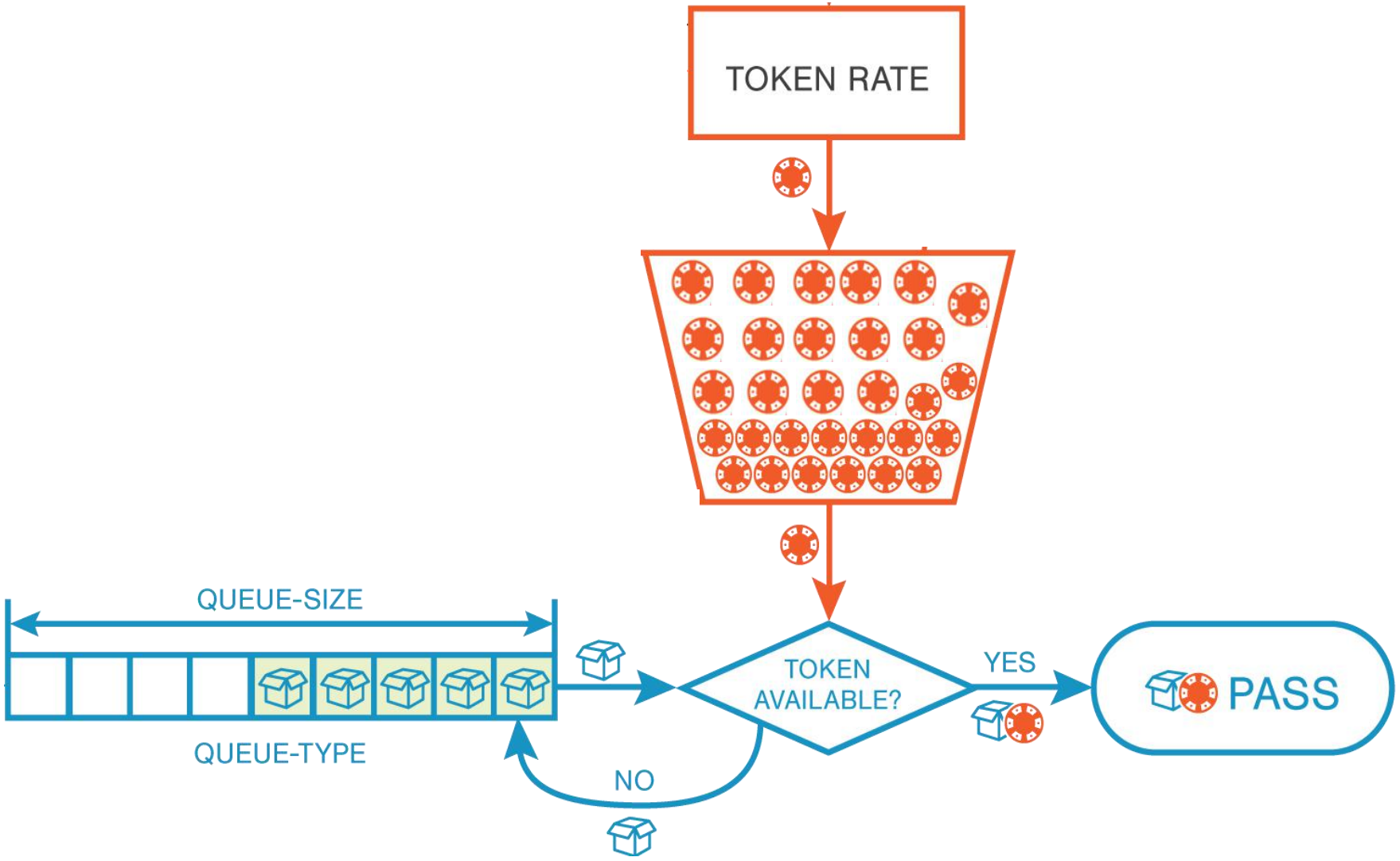
Detik ke-	Max-limit	bucket	sisa bucket
1	512K	1.5M	3.5M
2	512K	1.5M	2M
3	512K	1.5M	512K
4	512K	512K	0
5	512K		

POC

- Client menggunakan 2 Mb



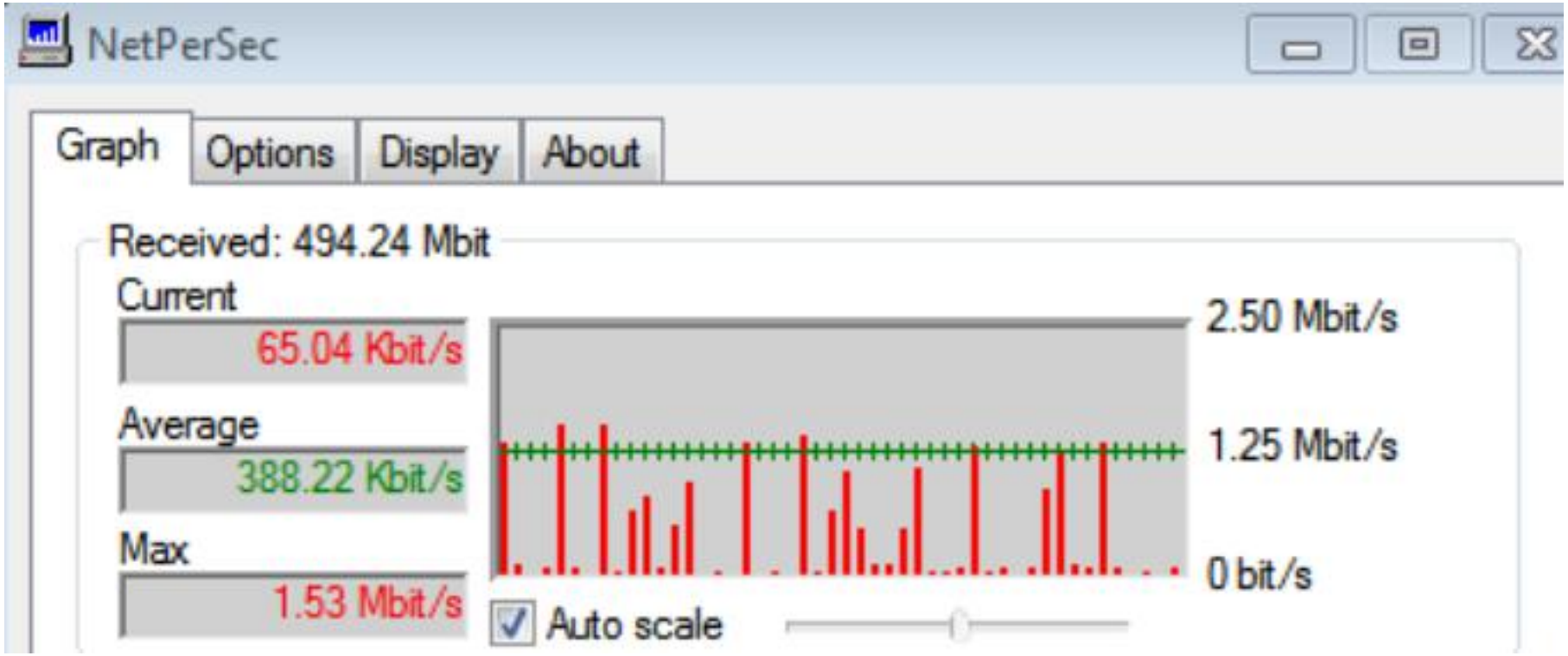
When the bucket full?



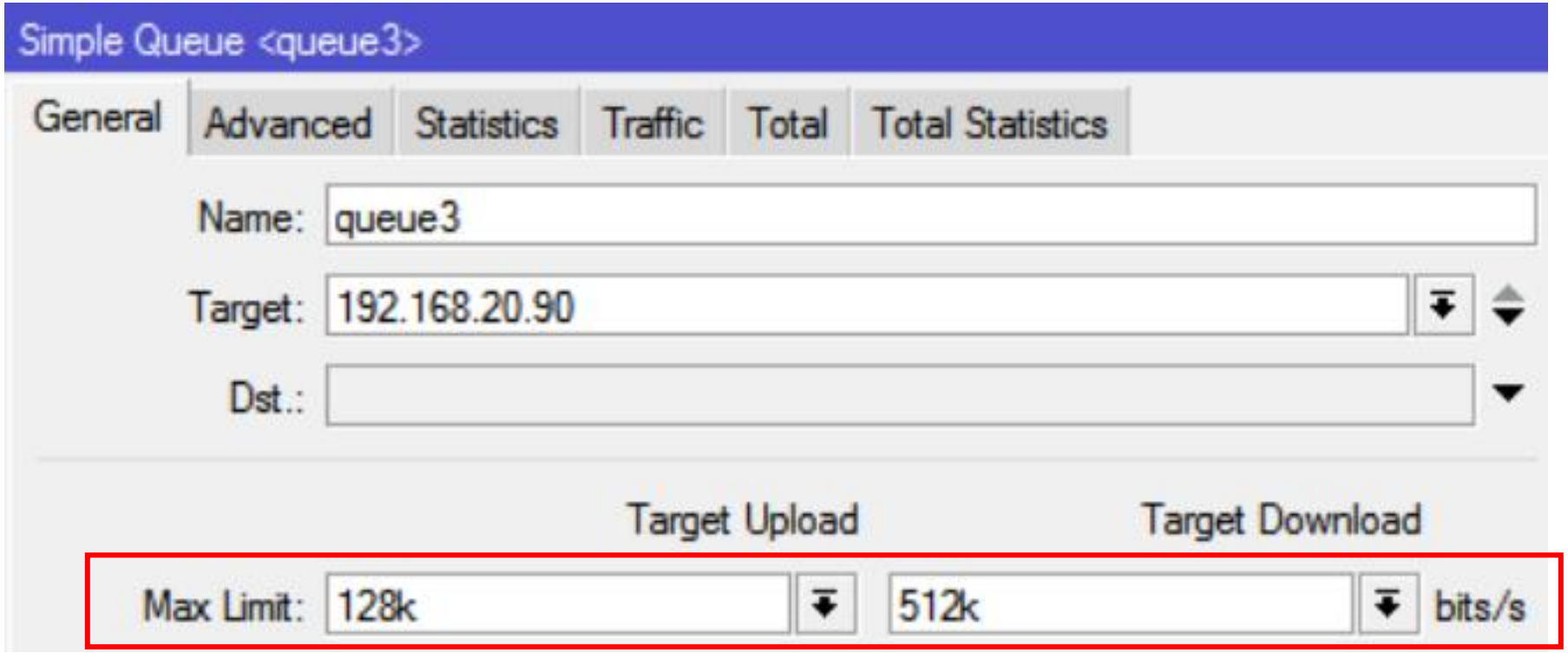
EXAMPLE CASE

How data work?

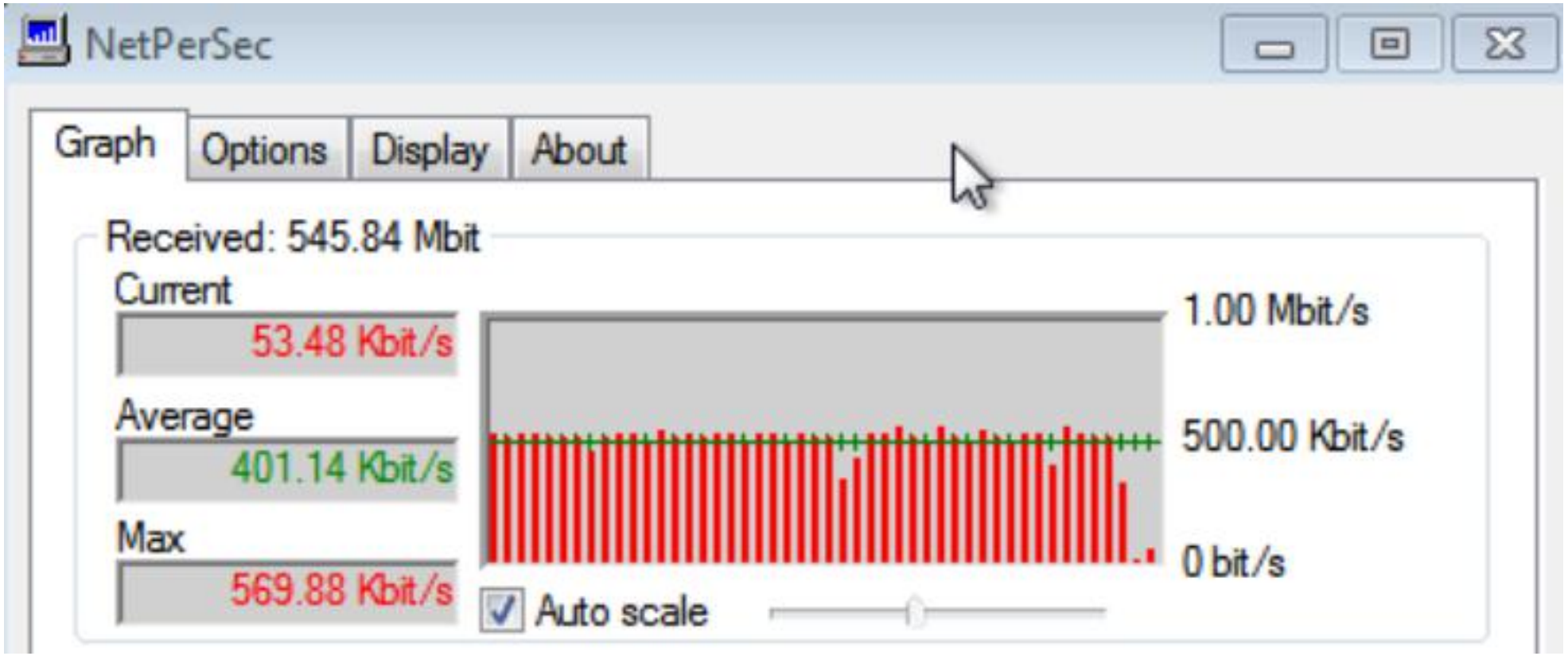
- Without queue



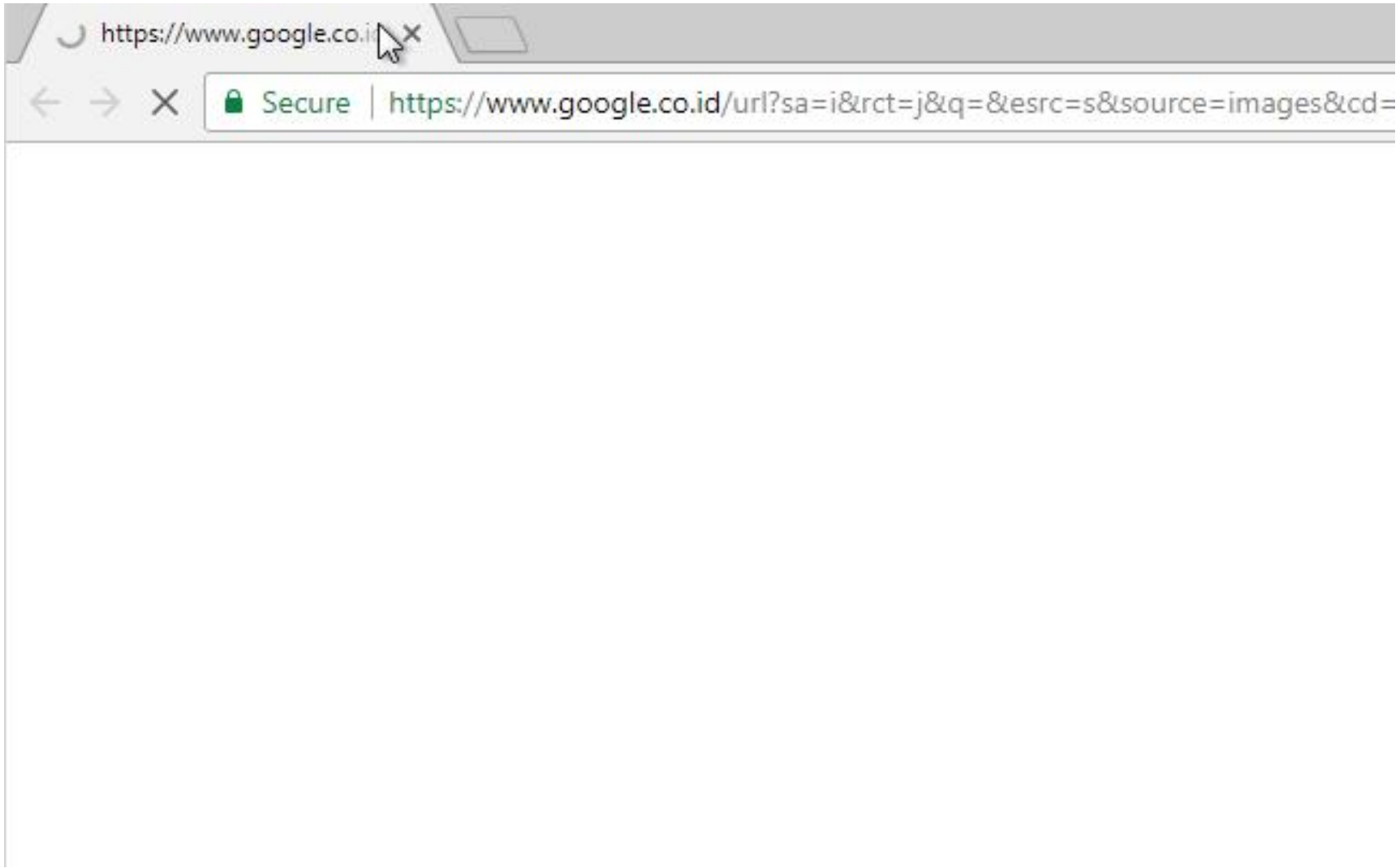
Try to create queue



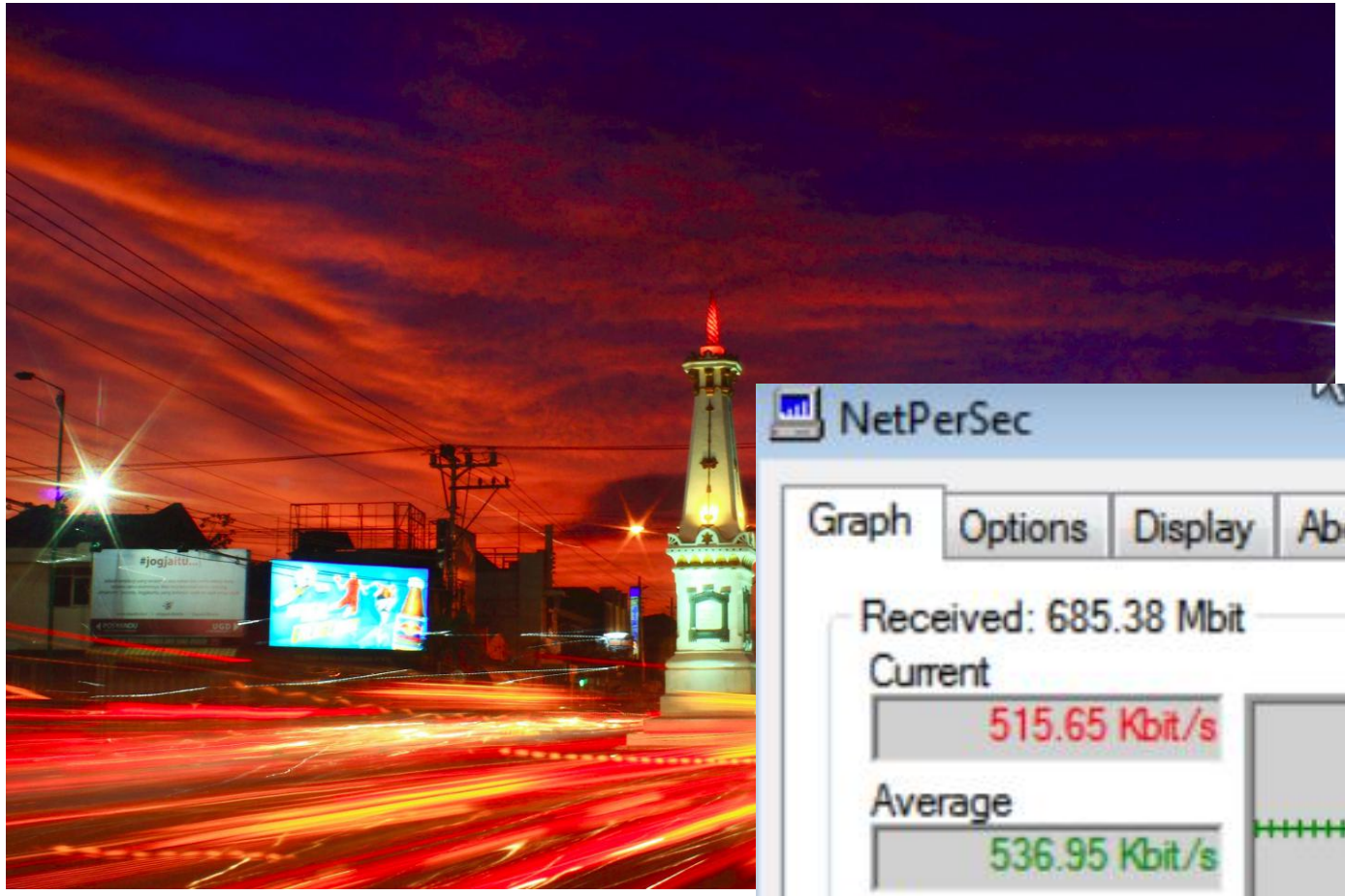
Trafic with queue



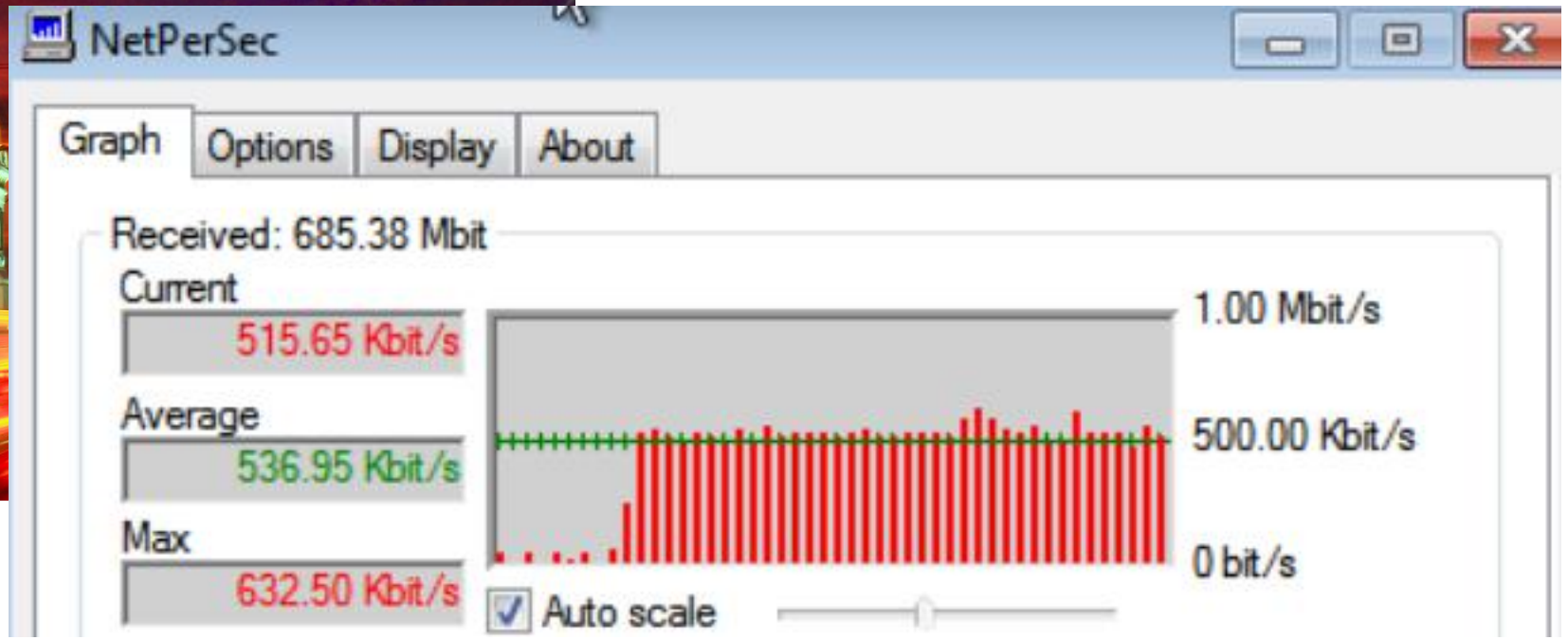
Try to open google



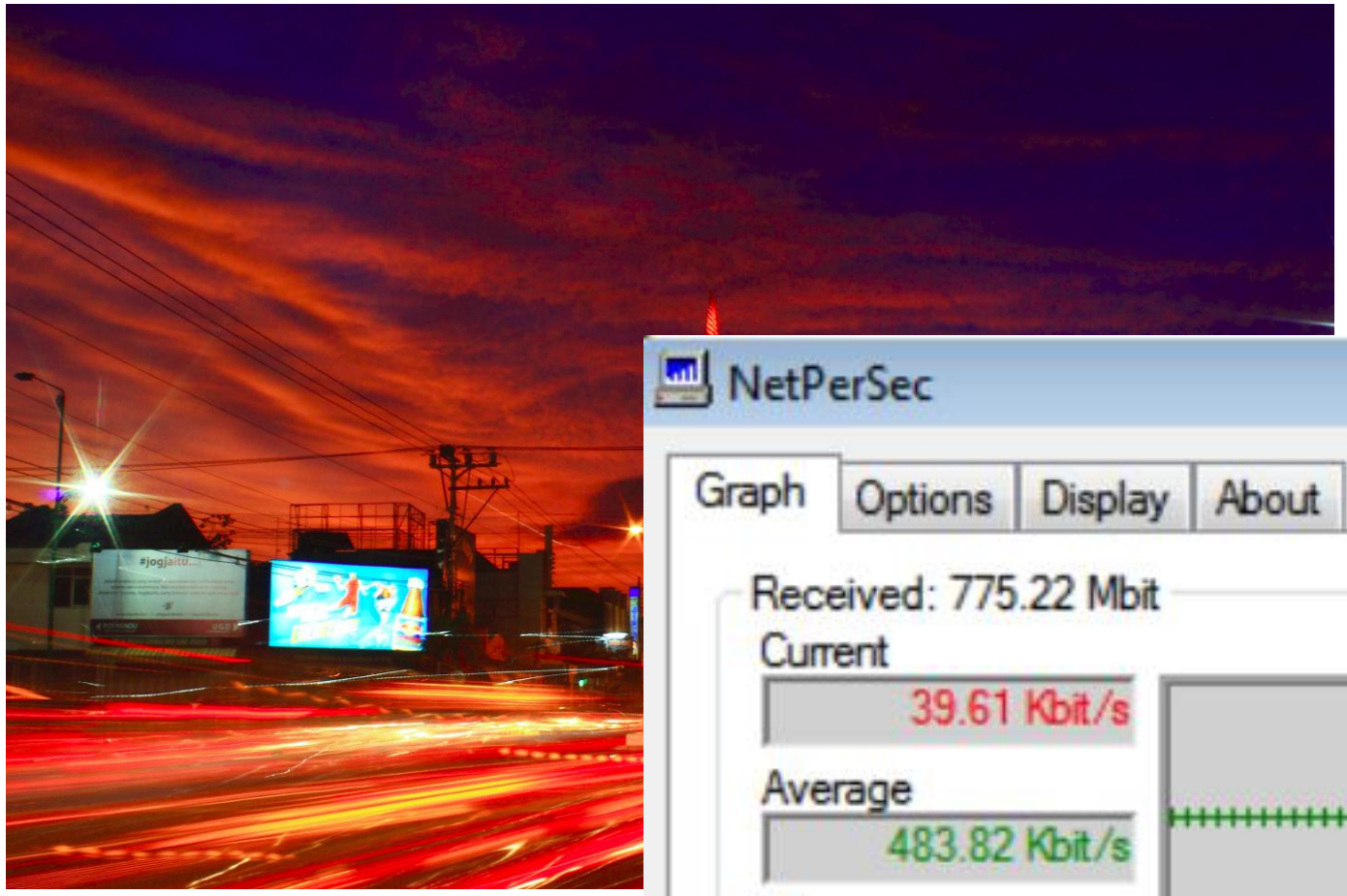
Open a picture

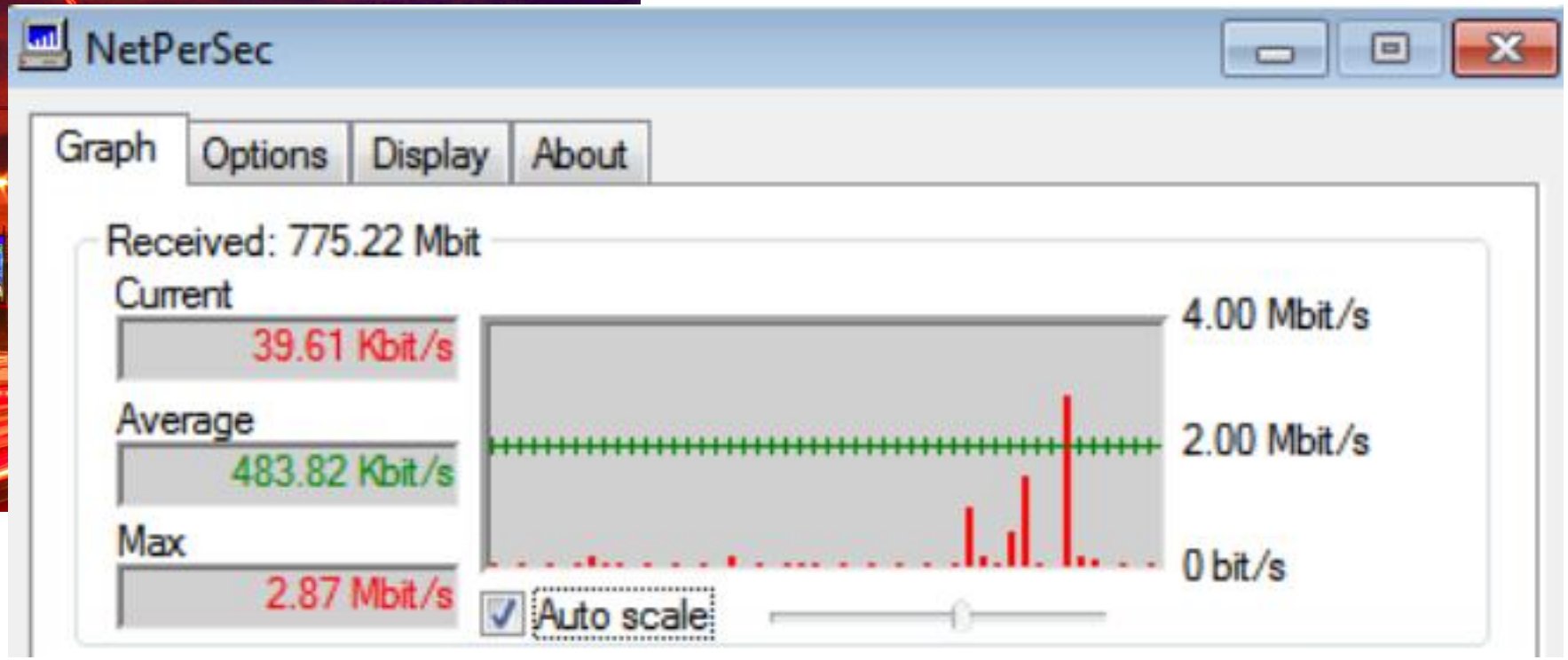


pic size = 1200x674
need 39 seconds to access 1 picture

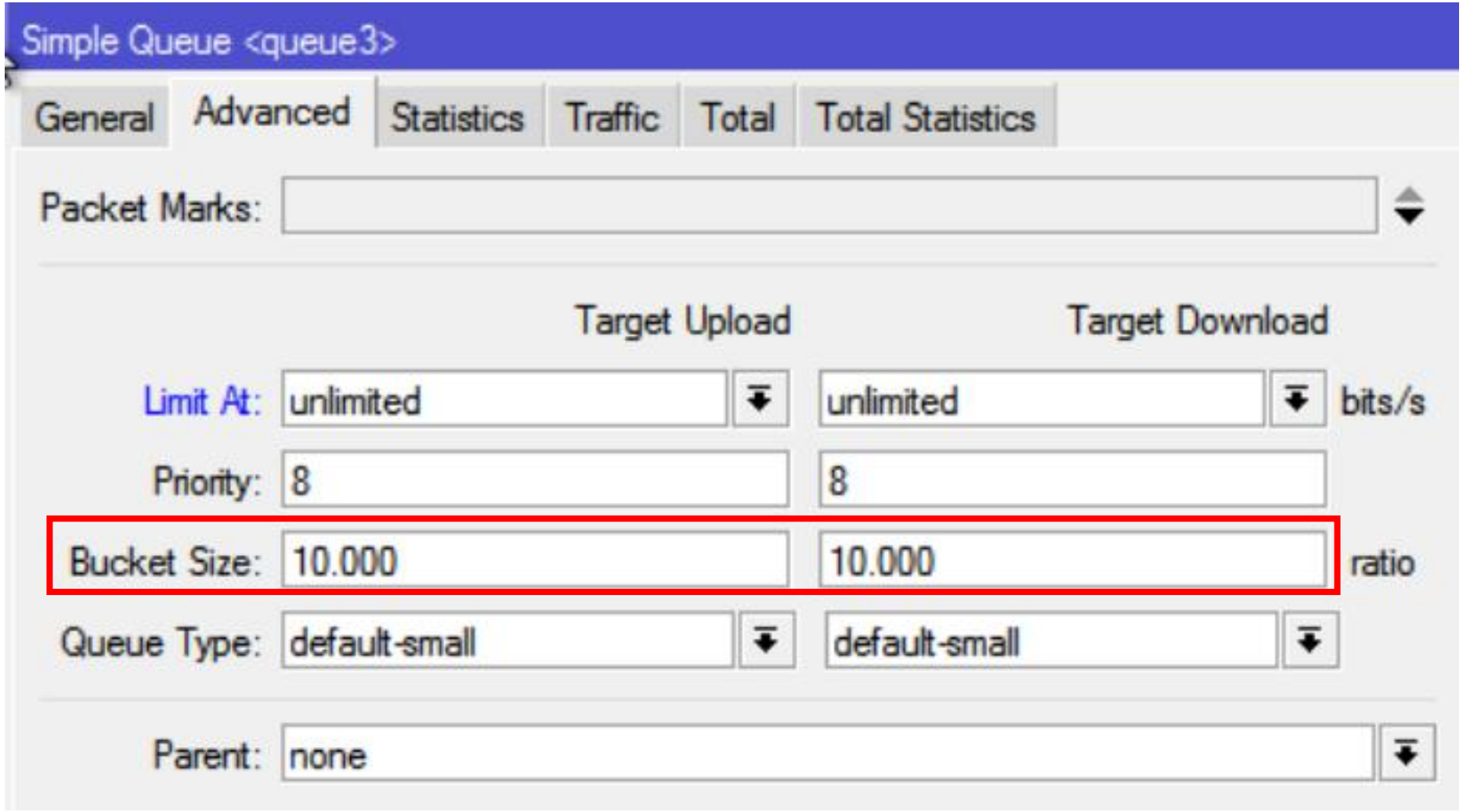


Open a picture (without queue)

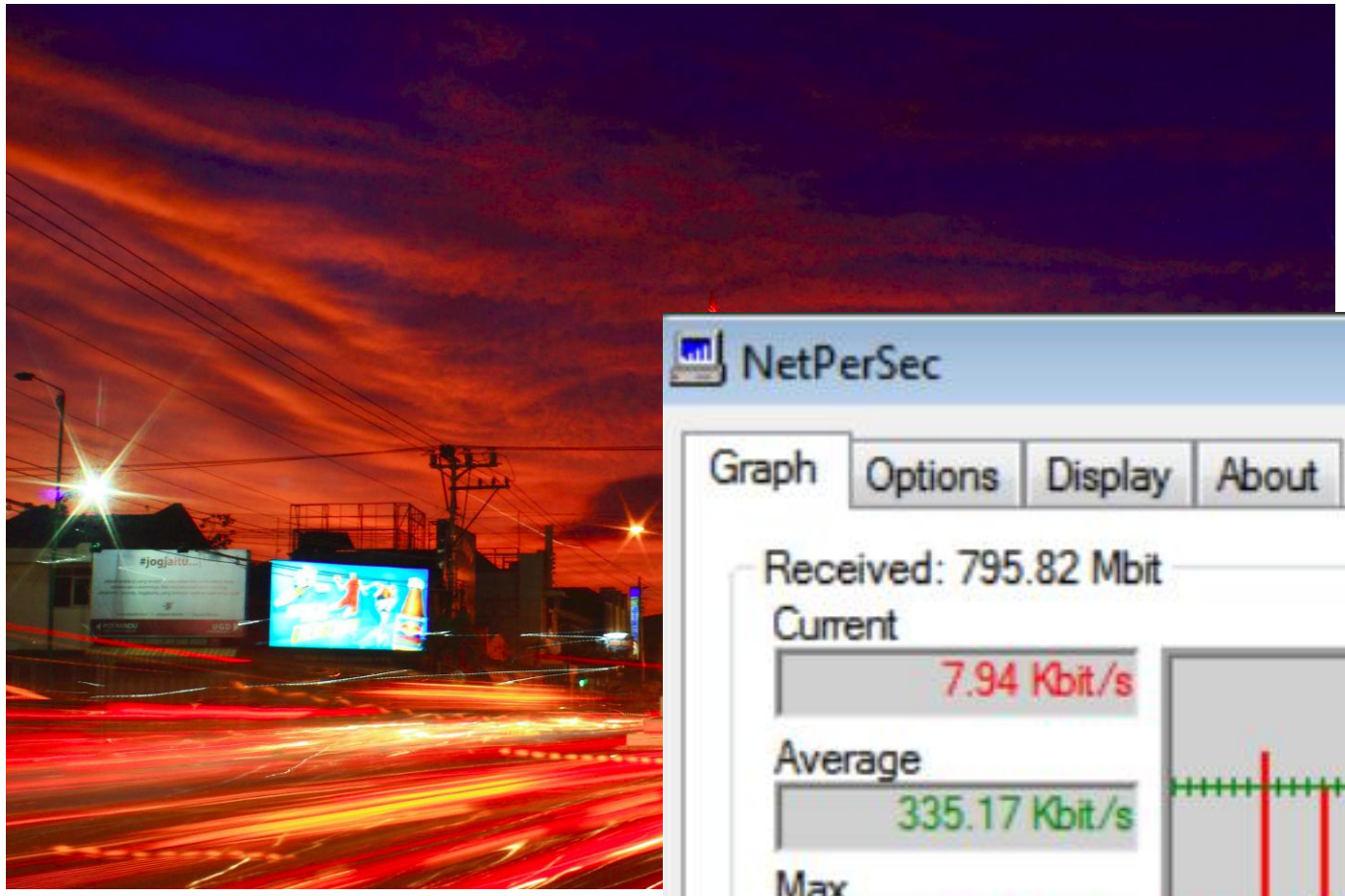


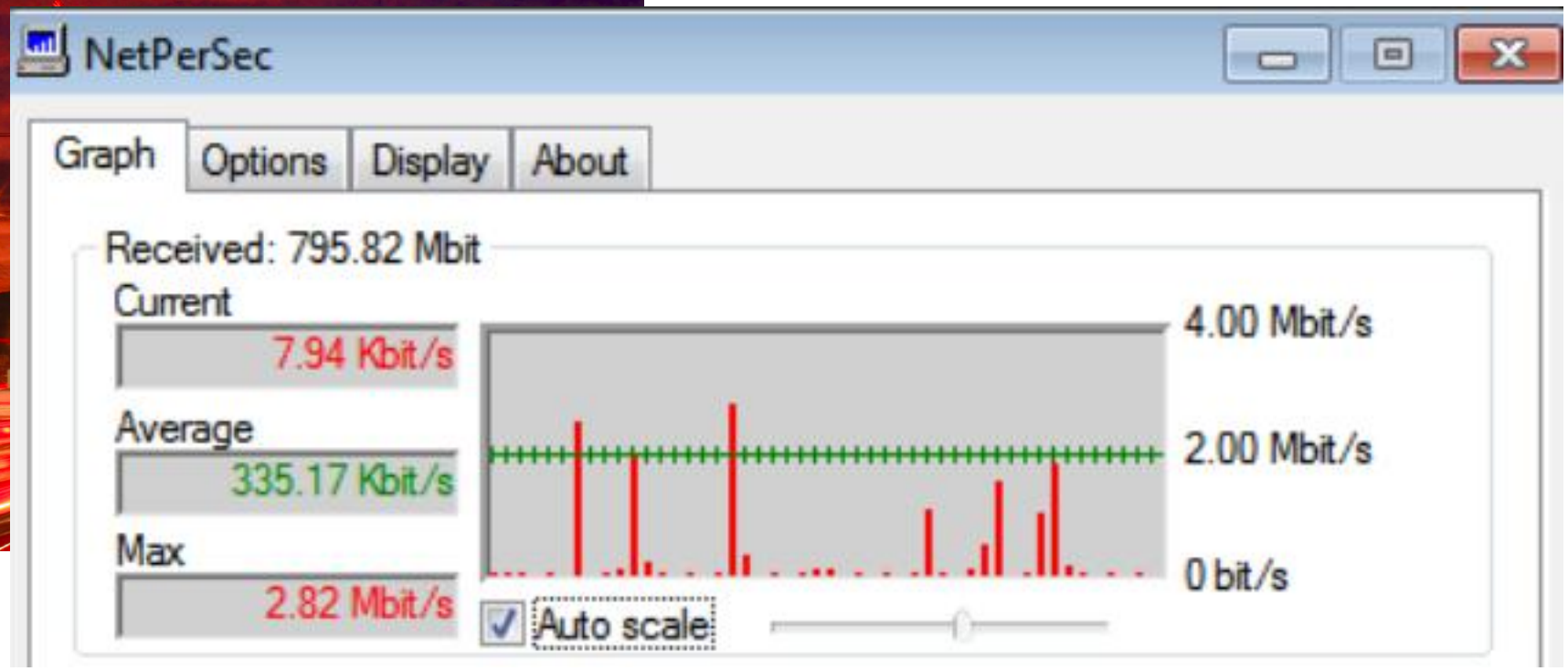


Modify bucket size

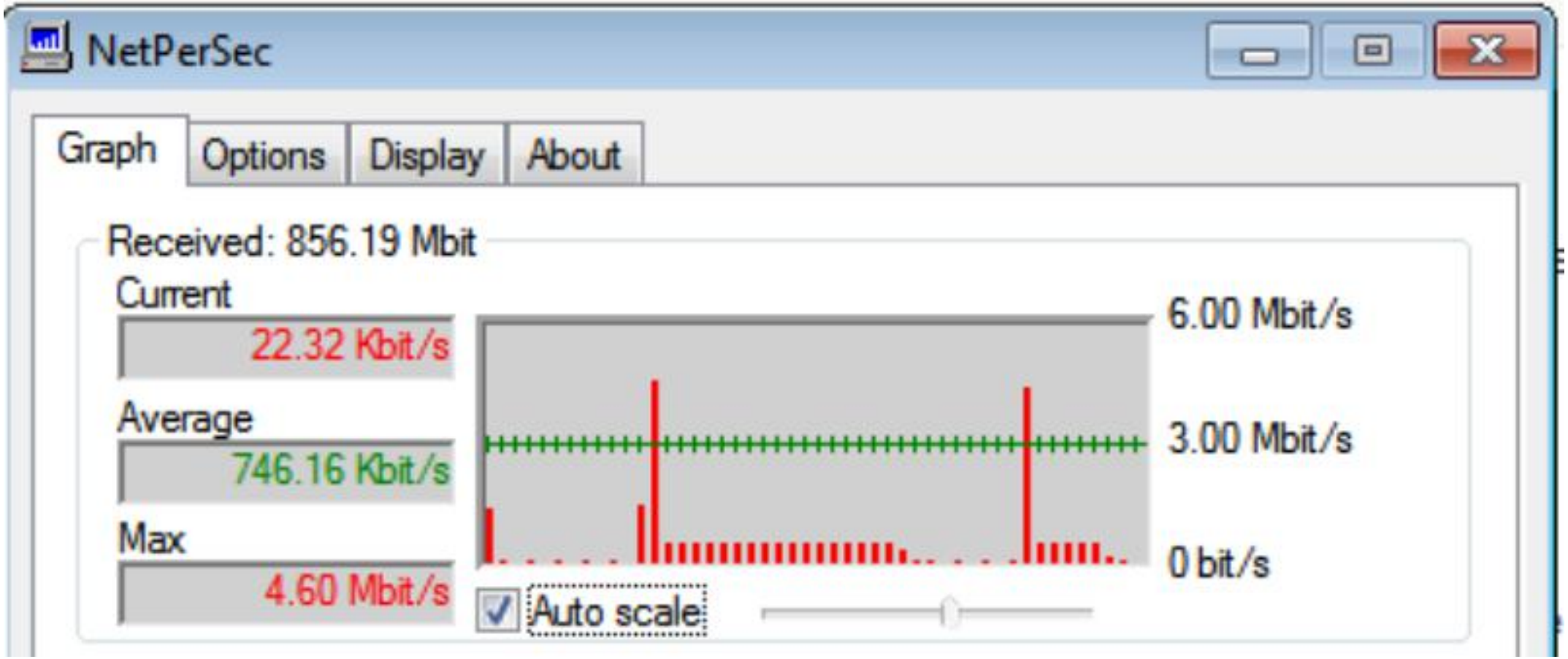


Open a picture



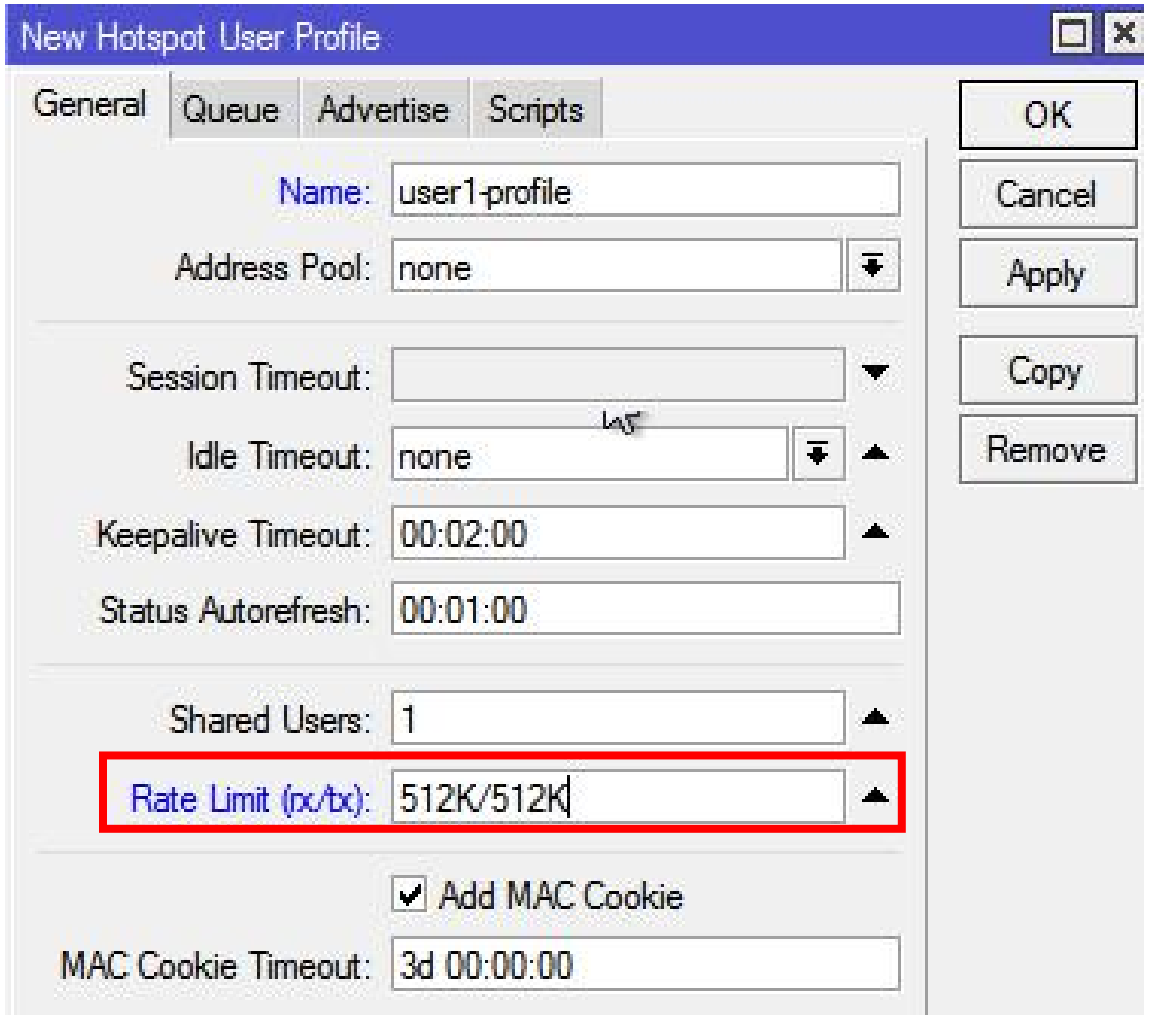


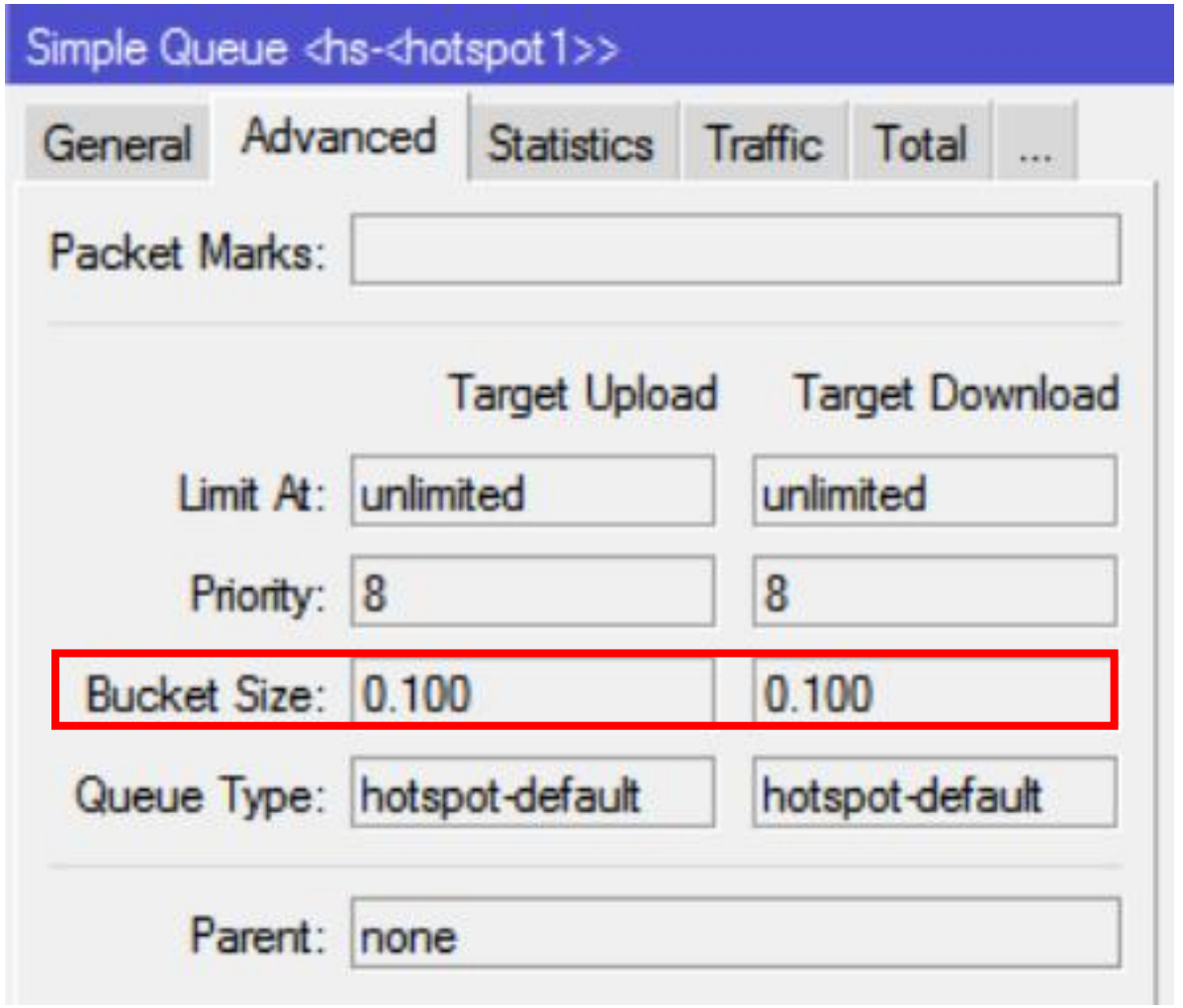
This is how to bucket size work



BUCKET SIZE
in
HOTSPOT NETWORK

Dynamic Queue





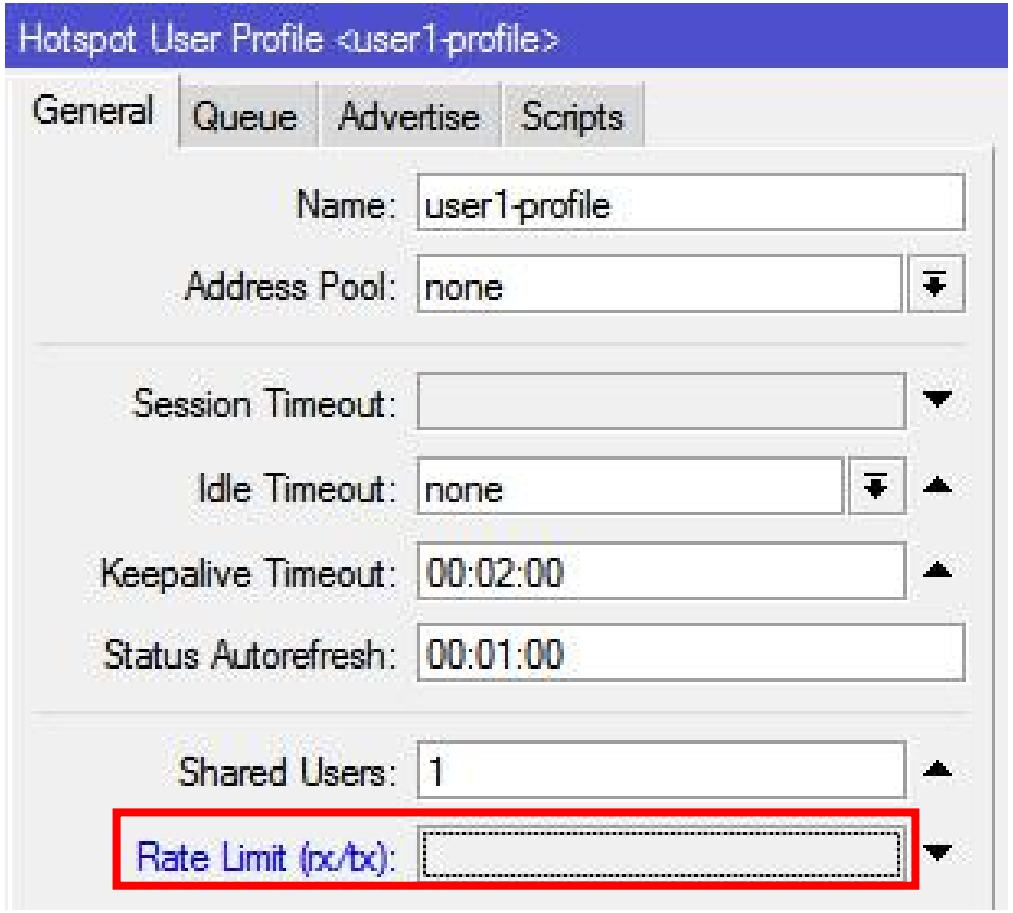
Burst

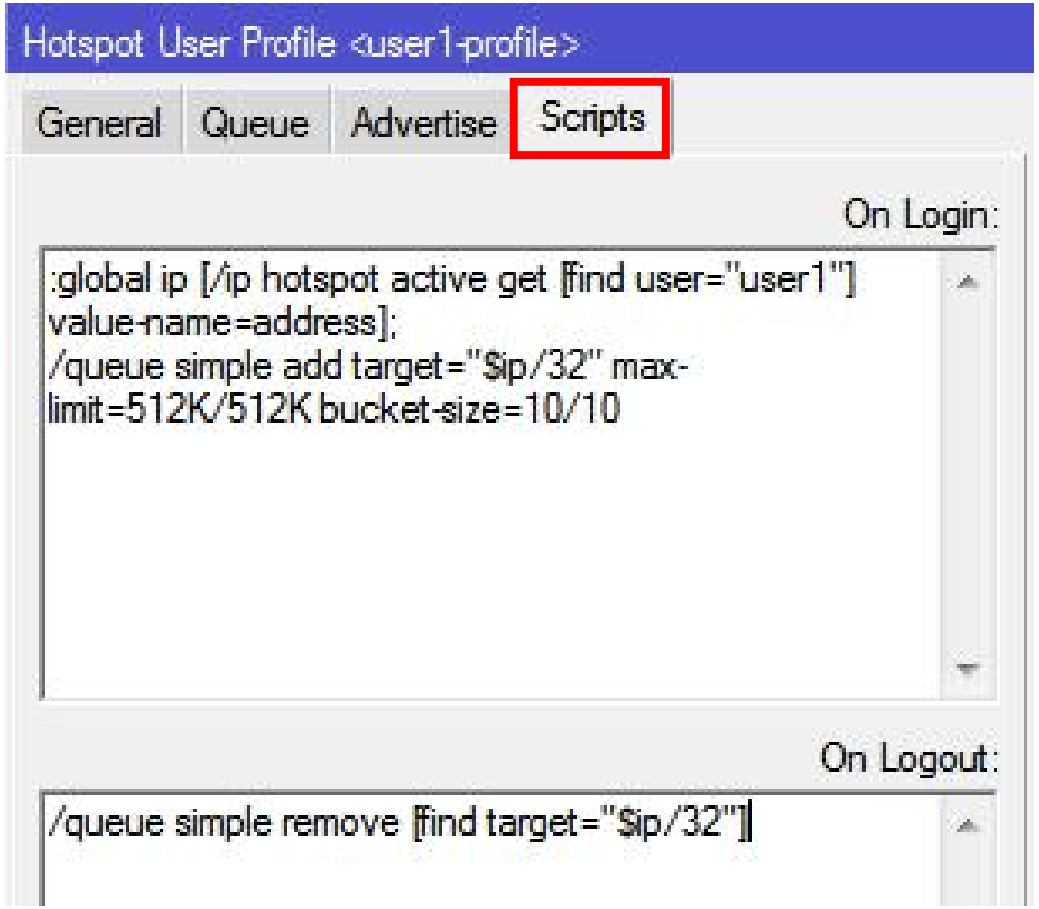
`rate-limit` (*string*; Default: "")	Rate limitation in form of **rx-rate[/tx-rate] [rx-burst-rate[/tx-burst-rate] [rx-burst-threshold[/tx-burst-threshold] [rx-burst-time[/tx-burst-time]]]] [priority] [rx-rate-min[/tx-rate-min]]** from the point of view of the router (so "rx" is client upload, and "tx" is client download). All rates should be numbers with optional 'k' (1,000s) or 'M' (1,000,000s). If tx-rate is not specified, rx-rate is as tx-rate too. Same goes for tx-burst-rate and tx-burst-threshold and tx-burst-time. If both rx-burst-threshold and tx-burst-threshold are not specified (but burst-rate is specified), rx-rate and tx-rate is used as burst thresholds. If both rx-burst-time and tx-burst-time are not specified, 1s is used as default. rx-rate-min and tx-rate min are the values of limit-at properties

Rate limitation in form of **rx-rate[/tx-rate] [rx-burst-rate[/tx-burst-rate] [rx-burst-threshold[/tx-burst-threshold] [rx-burst-time[/tx-burst-time]]]] [priority] [rx-rate-min[/tx-rate-min]]** from the point of view of the router (so "rx" is client upload, and "tx" is client download).


Character
AutoBlackToTitle.cs
ClickToStart.cs
Explosion.cs
Explosive.cs
Fire.cs
FloorSection.cs
GameControl.cs
GameGUI.cs
Hose.cs
MapIcons.cs
MessageGUI.cs
MoveBetweenPoints
Player.cs
Priority Particle Add.
PriorityAlphaParticle
SceneChanger.cs
SmokeParticles.cs
WaterHoseParticles
WaterSplash.cs
vignette.blurDistance = (1-health)
vignette.chromaticAberration = heatEffect
void OnTriggerStay(Collider c)
var fire = c.GetComponent<Fire>();
if (fire && fire.alive)
float dist = 1-((transform.position
NearHeat(dist);
var smoke = c.GetComponent
if (smoke &&
float dist = 1-((transform.position
NearSmoke(dist);
void OnCollisionEnter(Collision c)
healthBox

Manipulate Bucket Size





The Script

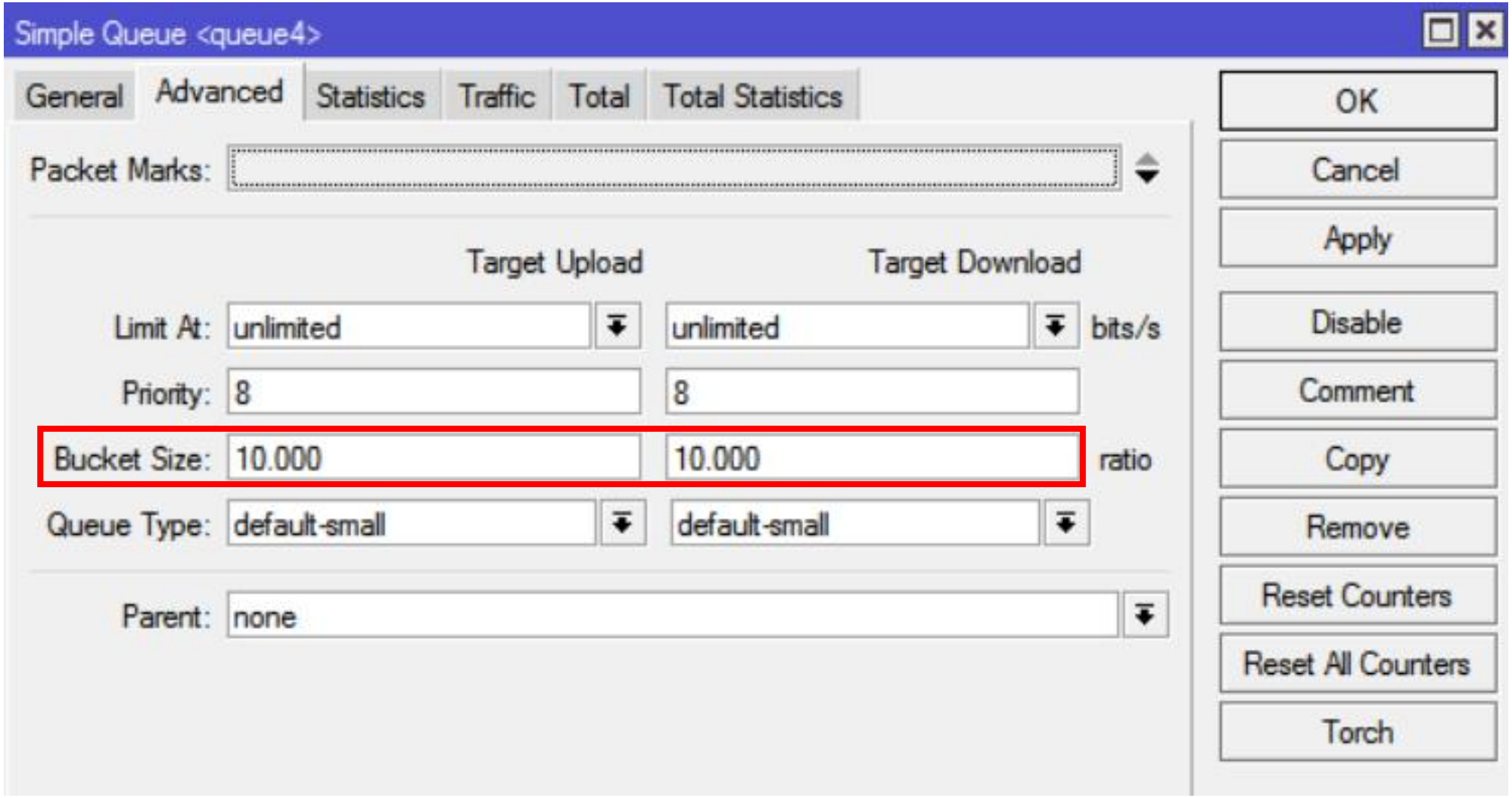
- **On Login**

```
:global ip [/ip hotspot active get [find user="user1"]
value-name=address];
/queue simple add target="$ip/32" max-limit=512K/512K
bucket-size=10/10
```

- **On Logout**

```
/queue simple remove [find target="$ip/32"]
```

The Result


Simple Queue <queue4>
General
Advanced
Statistics
Traffic
Total
Total Statistics
Packet Marks:
Target Upload
Target Download
Limit At:
unlimited
unlimited
bits/s
Priority:
8
8
Bucket Size:
10.000
10.000
ratio
Queue Type:
default-small
default-small
Parent:
none
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters
Torch

Bucket Size vs Burst

VS

How Burst Work

- max-limit = 512kbps
- burst-threshold = 384kbps
- burst-limit = 1024kbps
- burst-time = 16s

Detik ke-	Kalkulasi	Data Rate	Actual Rate
1	(0+0+0+0+0+0+0+0+0+0+0+0+0+0+0+0)/16	0	1024
2	(0+0+0+0+0+0+0+0+0+0+0+0+0+0+0+1024)/16	64	1024
3	(0+0+0+0+0+0+0+0+0+0+0+0+0+0+1024+1024)/16	128	1024
4	(0+0+0+0+0+0+0+0+0+0+0+0+0+1024+1024+1024)/16	192	1024
5	(0+0+0+0+0+0+0+0+0+0+0+0+1024+1024+1024+1024)/16	256	1024
6	(0+0+0+0+0+0+0+0+0+0+0+1024+1024+1024+1024+1024)/16	320	512
7	(0+0+0+0+0+0+0+0+0+0+512+1024+1024+1024+1024+1024)/16	352	512
8	(0+0+0+0+0+0+0+0+0+512+512+1024+1024+1024+1024+1024)/16	384	512
9	(0+0+0+0+0+0+0+0+512+512+512+1024+1024+1024+1024+1024)/16	416	512
10	(0+0+0+0+0+0+0+512+512+512+512+1024+1024+1024+1024+1024)/16	448	512
11	(0+0+0+0+0+0+512+512+512+512+512+1024+1024+1024+1024+1024)/16	480	512
12	(0+0+0+0+0+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16	512	512
13	(0+0+0+0+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16	544	512
14	(0+0+0+512+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16	576	512
15	(0+0+512+512+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16	608	512
16	(0+512+512+512+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16	640	512

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