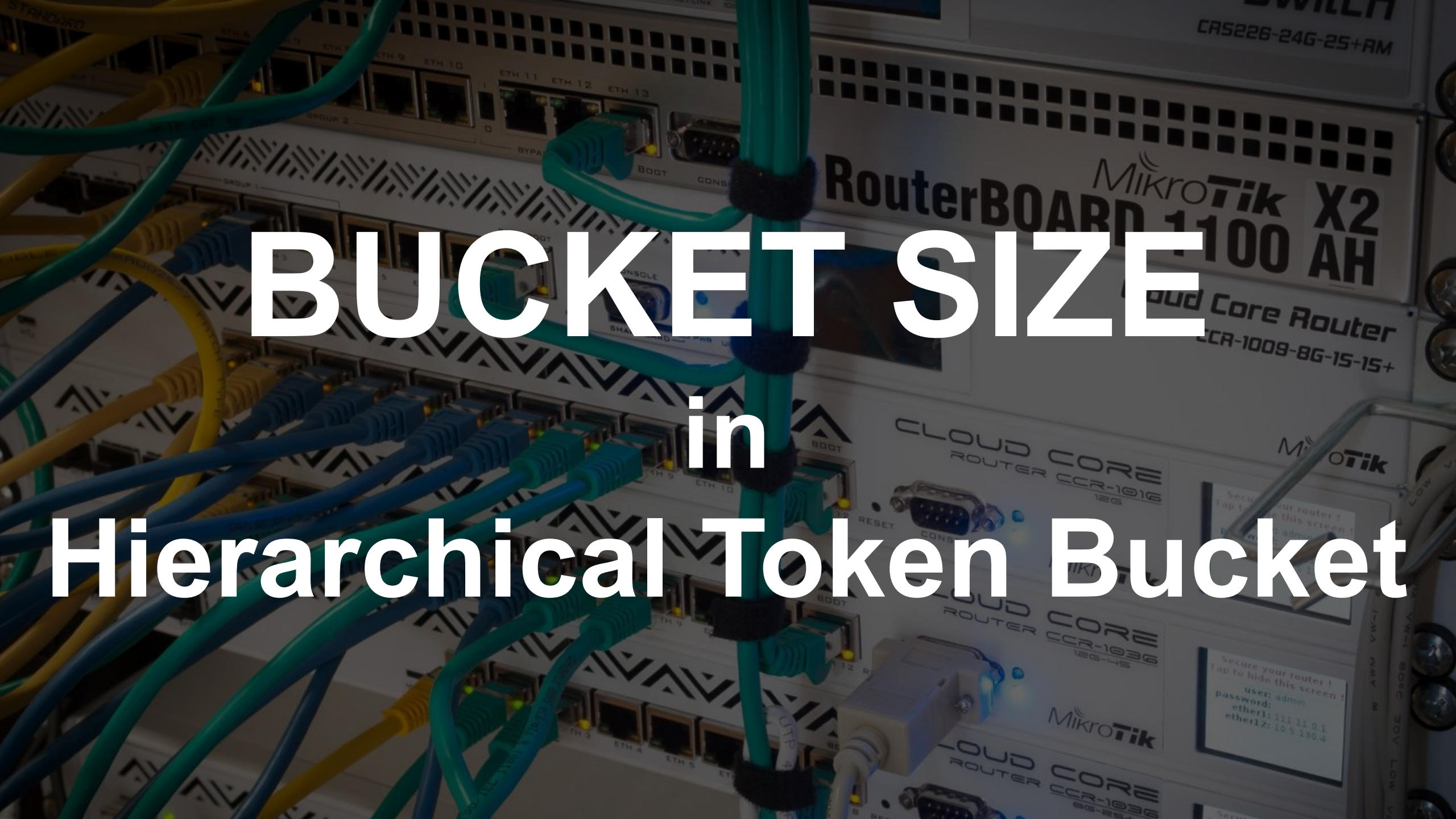




MikroTik

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



PENDAFTARAN PESANTREN IDN 2017

PESANTREN IDN MADINATUL ILMI JONGGOL



MATERI & PENDAFTARAN

NETWORKING CISCO, MIKROTIK, UBIQUITI, JUNIPER SERTIFIKASI INTERNASIONAL	PERSYARATAN TIDAK MEROKOK, TIDAK PACARAN USIA MAKSIMAL 20 TAHUN LULUSAN SMK TKJ (NETWORKING SYSADMIN) LULUSAN SMK RPL (ANDROID DEV) SANGGUP MENGIKUTI PENDIDIKAN 1 TAHUN MENDAPATKAN IJIN OLEH ORANGTUA MEMBAWA LAPTOP SENDIRI
PROGRAMMER ANDROID ANDROID, WEB SERVICES, FRONTEND, BACKEND, API INTERNET OF THINGS, ARDUINO	PELAKSANAAN 14 OKTOBER 2017 - 14 OKTOBER 2018 MAKAN OLEH MASING-MASING SENDIRI BIAYA PENDIDIKAN GRATIS MENGINAP DISEDIAKAN GRATIS TRAINING DISEDIAKAN GRATIS MODUL BELAJAR DISEDIAKAN GRATIS SANGGUP SHOLAT DIAWAL WAKTU DI MASJID SANGGUP MENGIKUTI KAJIAN RUTIN
SYSADMIN WINDOWS SERVER LINUX SERVER VIRTUALIZATION (VMWARE, HYPER-V) CLOUD (OPENSTACK, AWS)	PENDAFTARAN 1 SEPTEMBER - 1 OKTOBER WWW.IDNFOUNDATION.ORG/DAFTAR SELEKSI : 1 SEPT - 1 OKT 2017 PENGUMUMAN : 4 OKTOBER INFORMASI : 087788 567782
CCIE 10 NOVEMBER MUSTI UJIAN WRITTEN FOKUS BELAJAR LAB	

FB.COM/GROUPS/IDNFOUNDATION IDNFOUNDATION.ORG 087788 567782

SMP-SMK IDN

PESANTREN MADINATUL ILMI JONGGOL

JL. TMMD MELATI-SODONG, DESA CIBODAS - DESA SINGASARI, KEC. JONGGOL, KAB. BOGOR, JAWA BARAT 16930
WWW.PESANTREN.IDN.ID - SMS/WA/TELP : 0812 800 40 100 / 0877 88 567 782 - PESANTREN@IDN.ID

JAGOAN IT, PINTER NGAJI



TRAINING NETWORKING GRATIS GURU SMK TKJ

MATERI : 1. CISCO CCNA 2. MIKROTIK MTCNA + EXAM 3. MIKROTIK MTCRE + EXAM 4. NETWORK MANAGEMENT SYSTEM 5. SUBNETTING COMPETITION 6. SUPERLAB COMPETITION 7. FIREWALK	PELAKSANAAN : 11-17 NOVEMBER 2017 PESANTREN IDN JONGGOL 08.00 - 24.00 WIB BAWA MIKROTIK SENDIRI BIAYA TRAINING GRATIS PENGINAPAN GRATIS MAKAN OLEH MASING2
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PENDAFTARAN :
IDNFOUNDATION.ORG/GURU

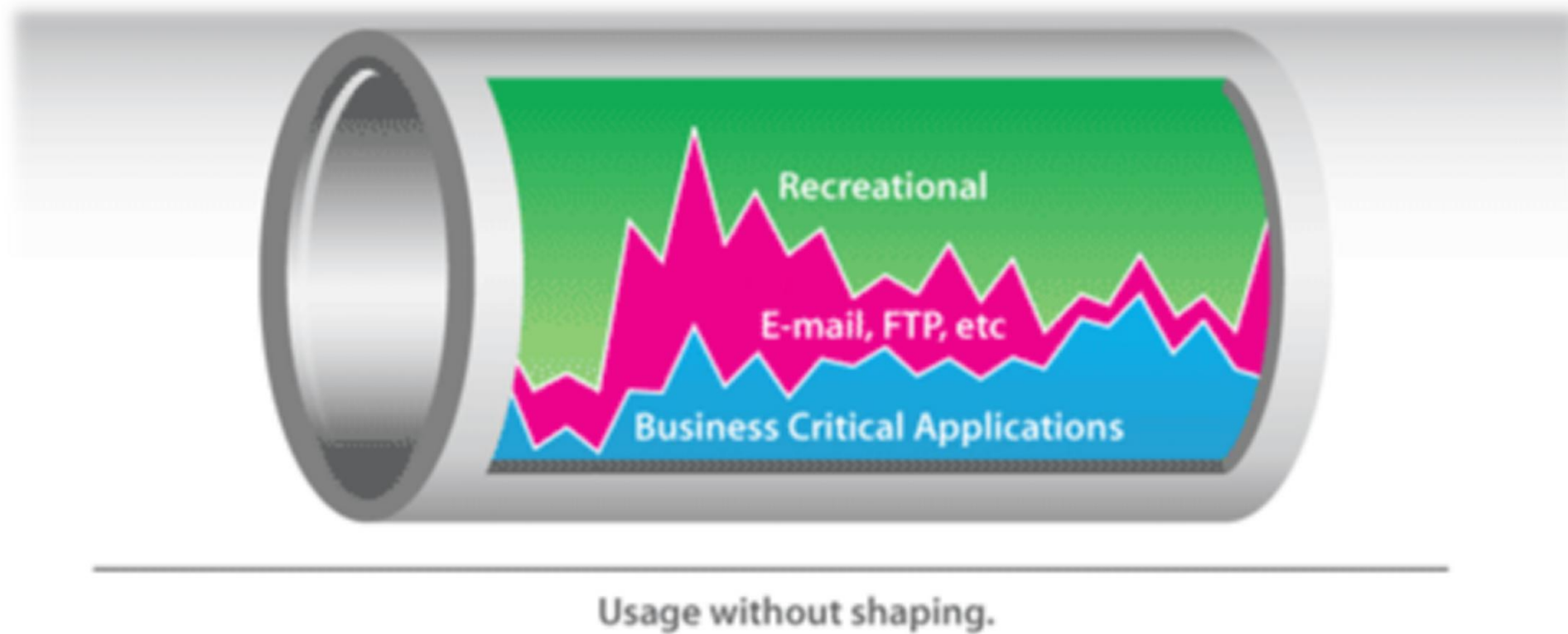
INFO@IDN.ID IDNFOUNDATION.ORG/GURU WA:087788 567782

Objective

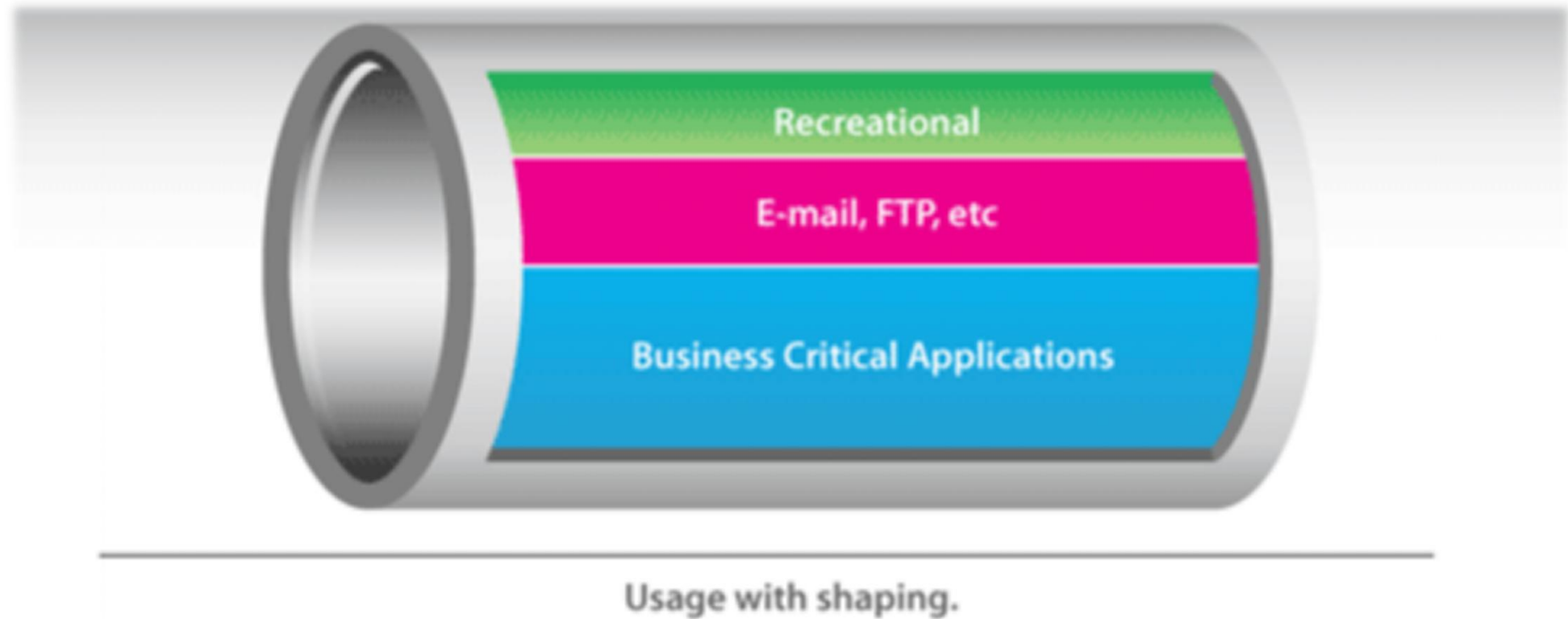
- Traffic shaping?
- Hierarchical Token Bucket
- Hierarchical in HTB
- Bucket Size in HTB
- Bucket Size in Hotspot Network
- Bucket Size vs Burst



Traffic Shaping?



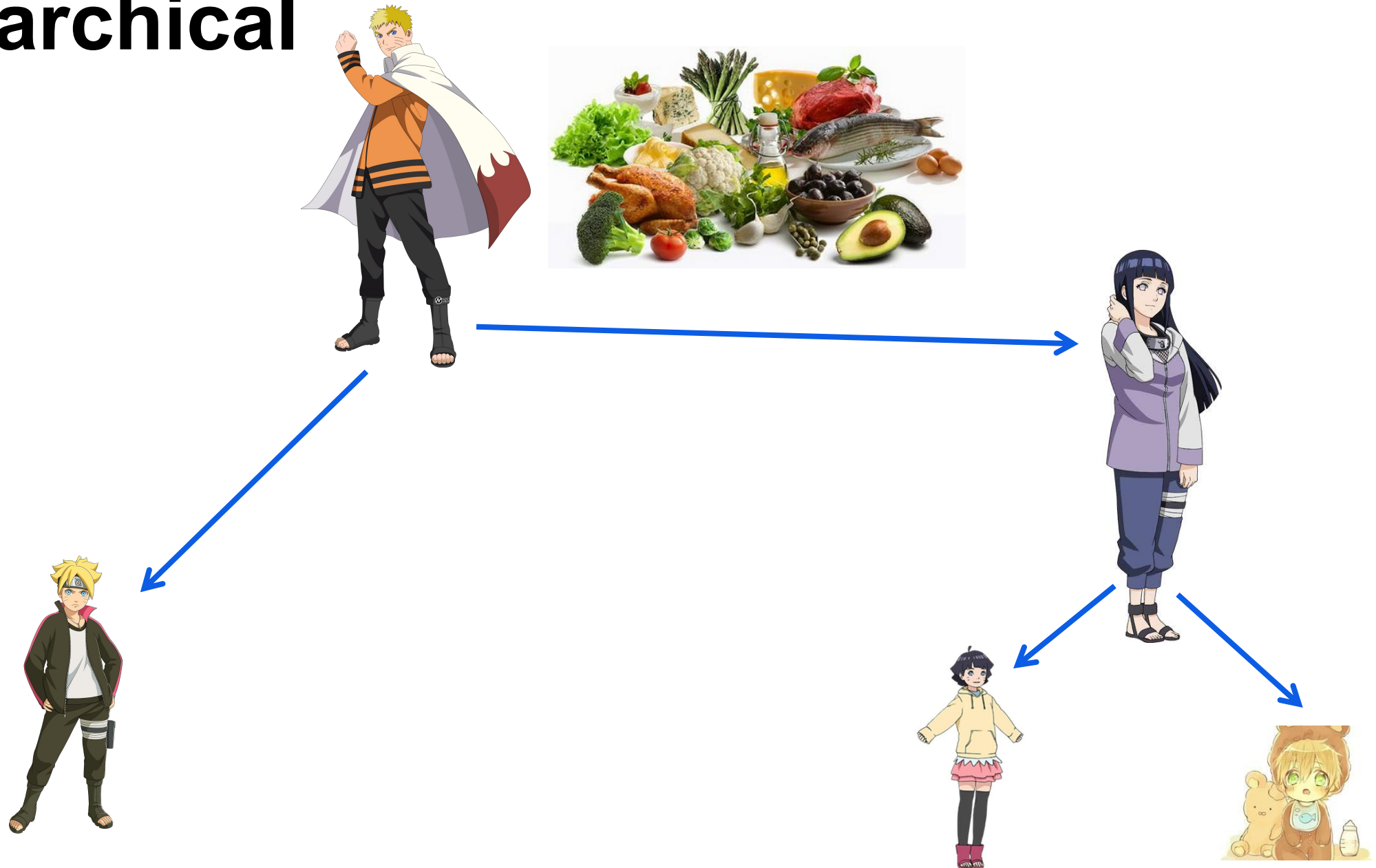
Traffic Shaping?



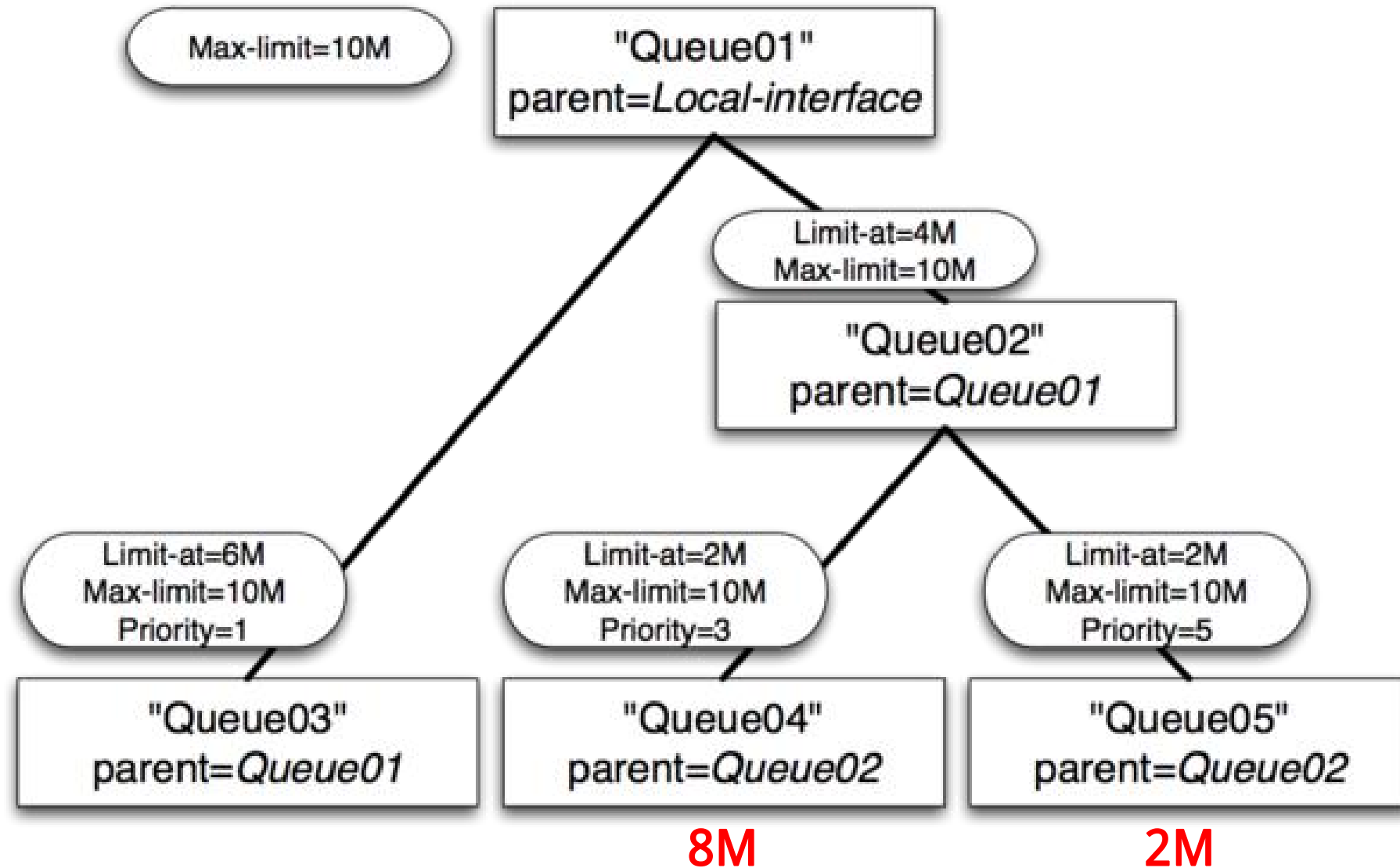
Hierarchical Token Bucket

- 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

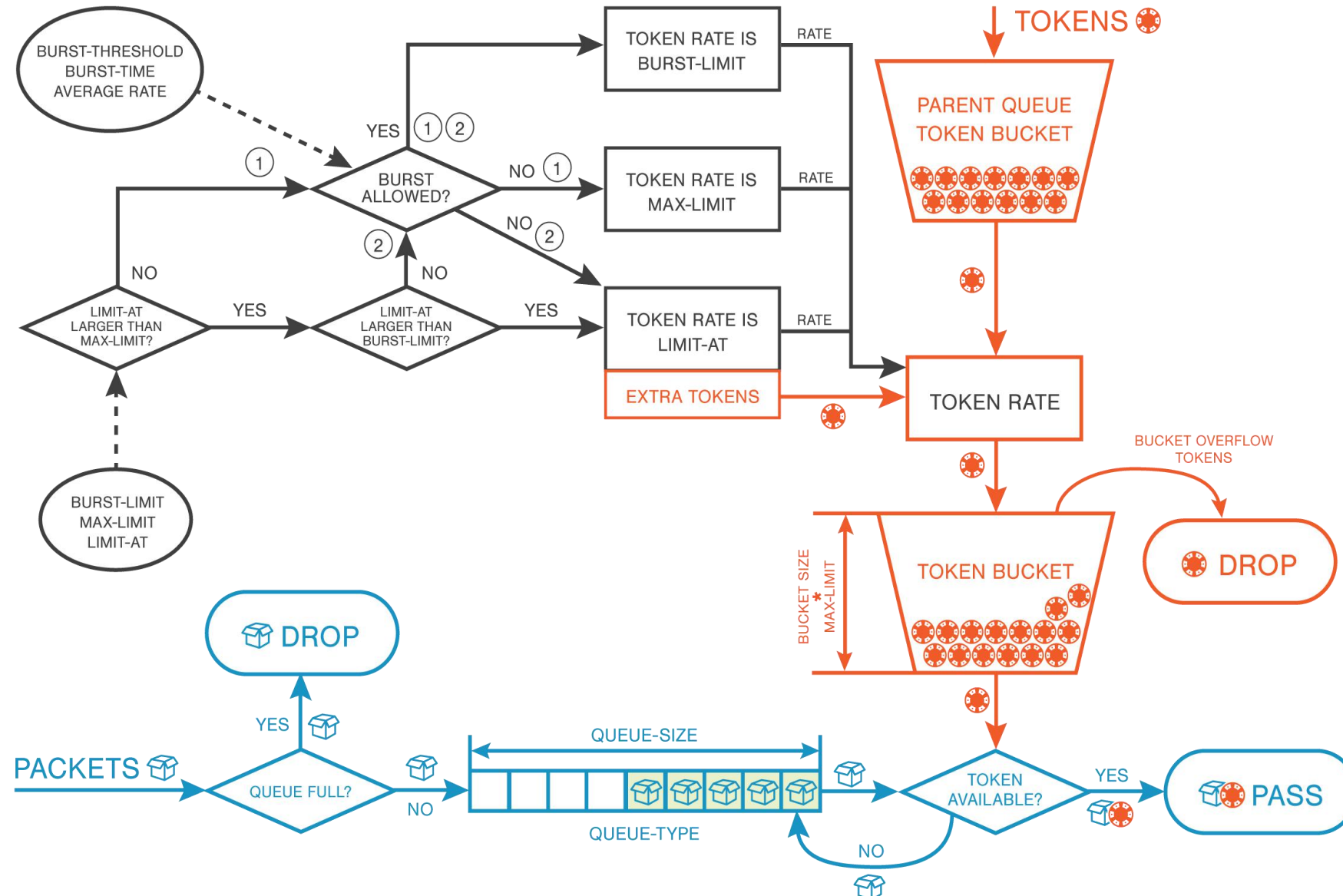
Hierarchical



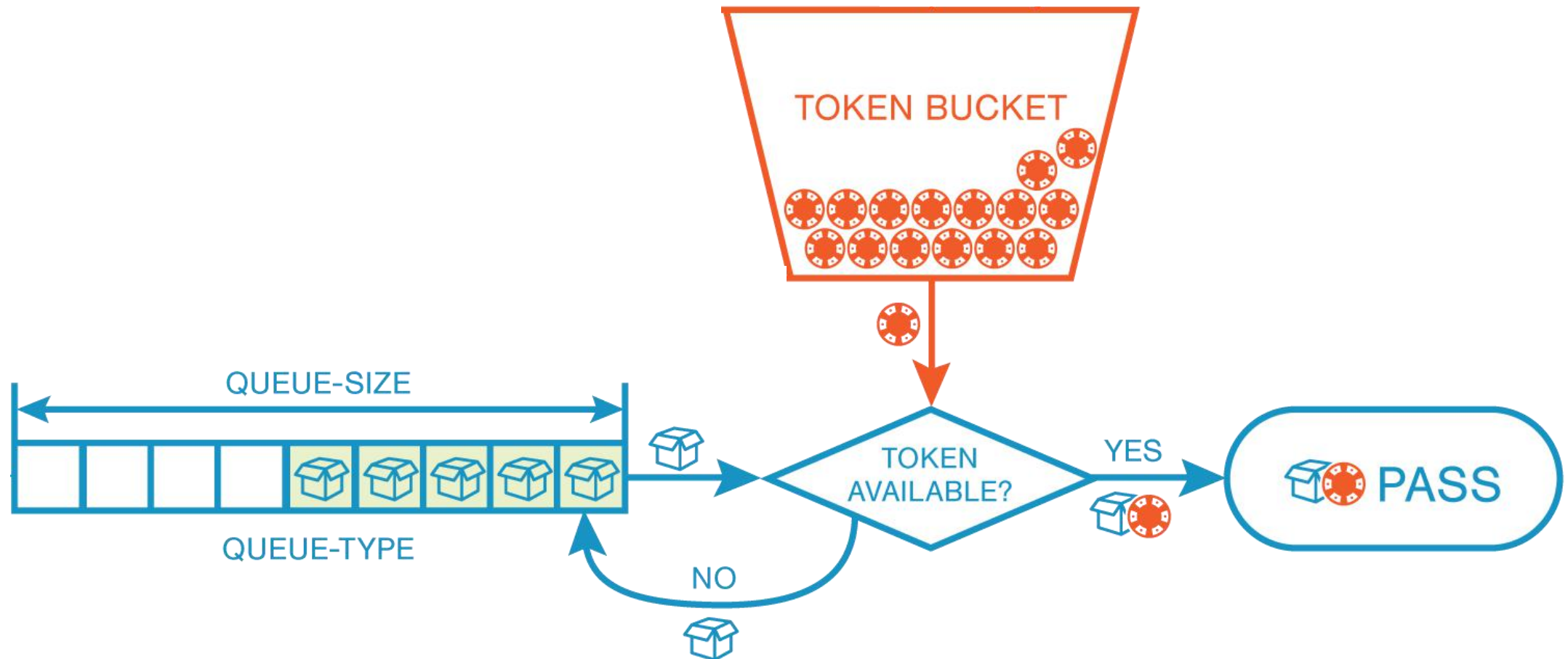
Hierarchical



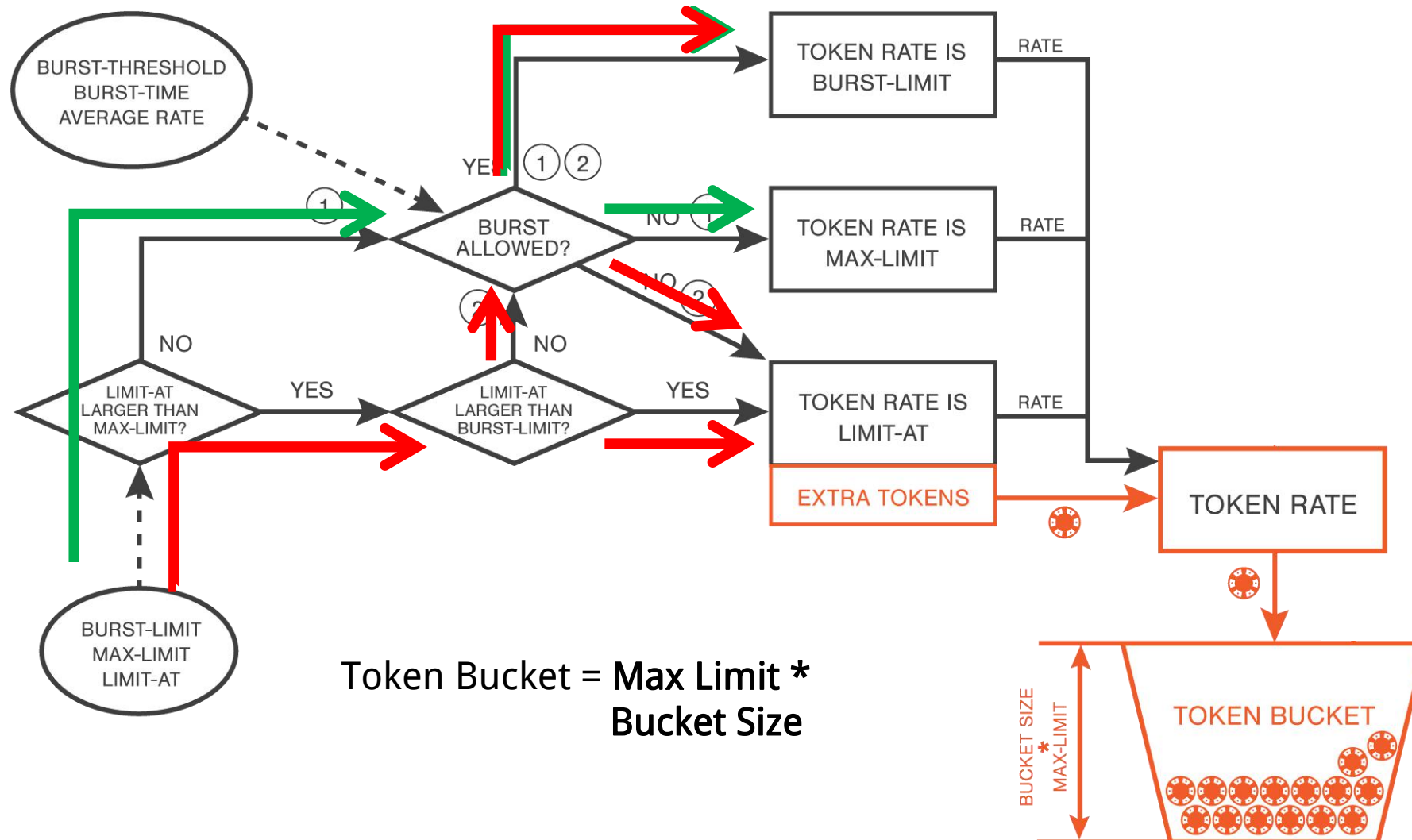
Token Bucket Algorithm



Token Bucket Algorithm



Token Bucket Capacity



Bucket size

New Simple Queue

General Advanced Statistics Traffic Total Total Statistics

Packet Marks: no-mark

	Target Upload	Target Download
Limit At:	unlimited	unlimited
Priority:	8	8
Bucket Size:	0.100	0.100
Queue Type:	default-small	default-small
Parent:	none	

bits/s

ratio

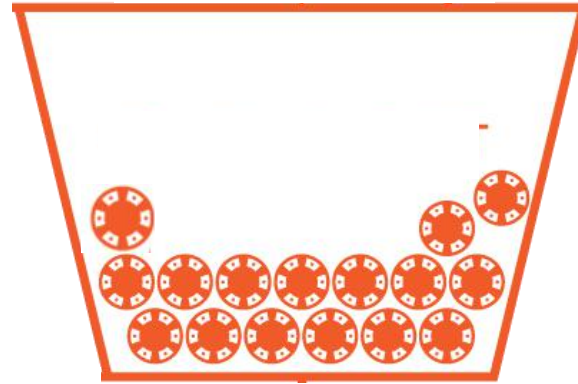
Applies to
RouterOS:
v6.35+



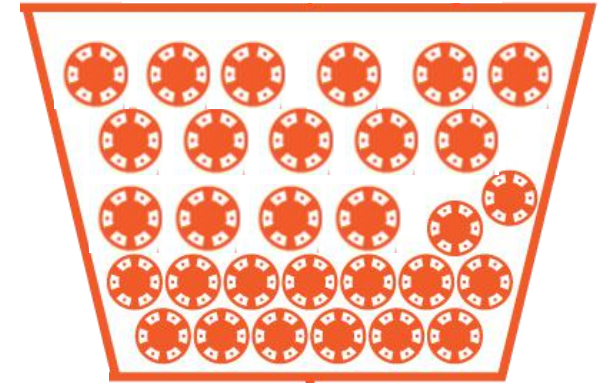
The Rule



Packet not sent



Normal Traffic



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

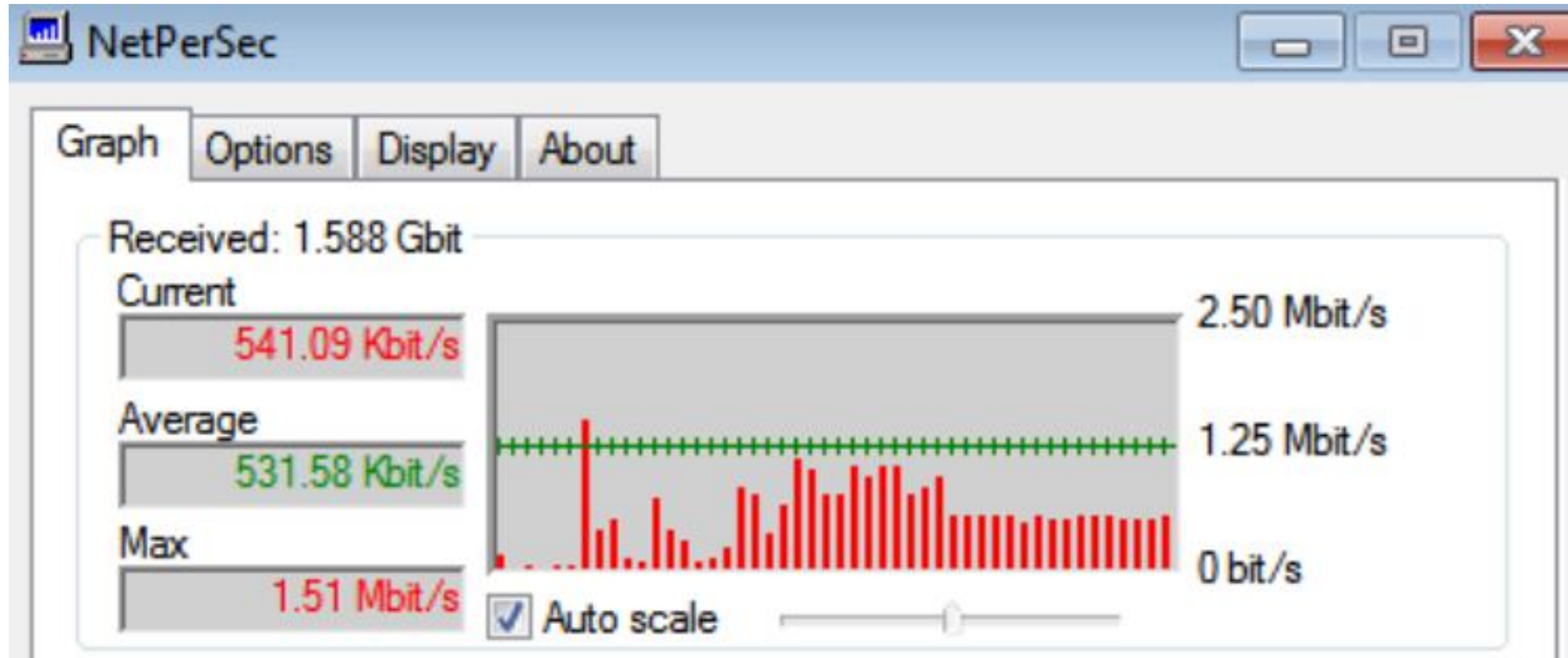
Kalkulasi bucket capacity

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

Detik ke-	Max-limit	bucket	sisanya 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



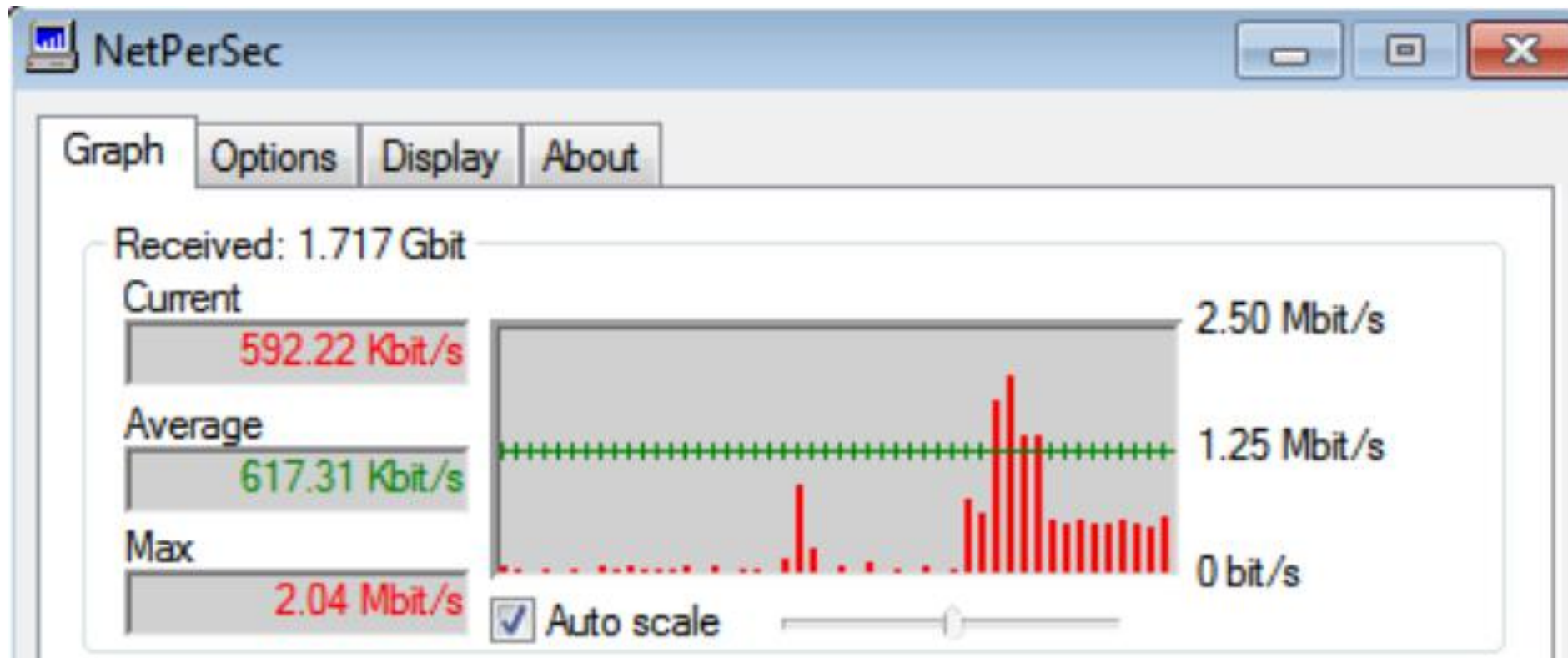
Kalkulasi bucket capacity

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

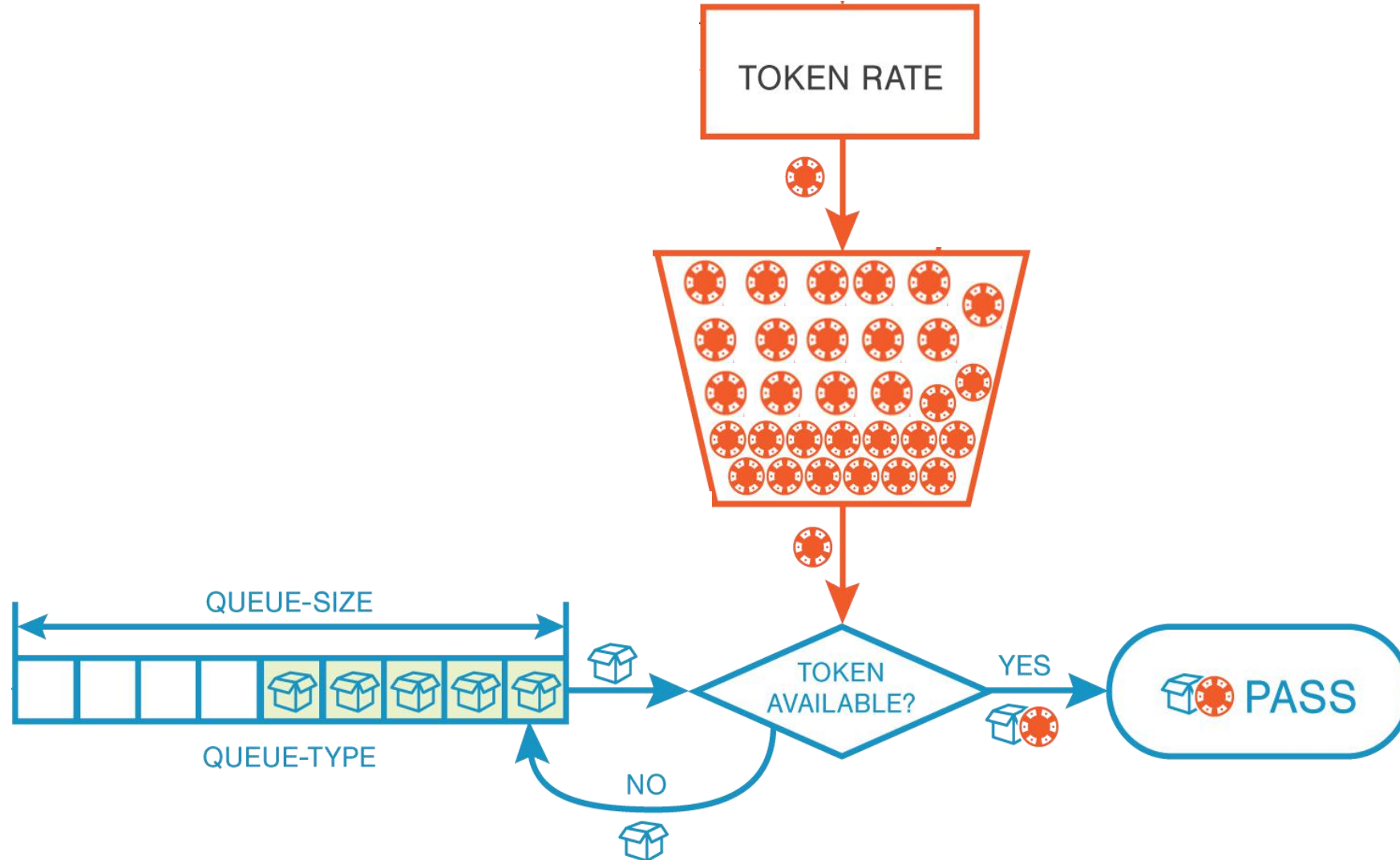
Detik ke-	Max-limit	bucket	siswa bucket
1	512K	1.5M	3.5M
2	512K	1.5M	2M
3	512K	1.5M	512K
4	512K	512K	0
5	512K		

POC

- Client menggunakan 2 Mb



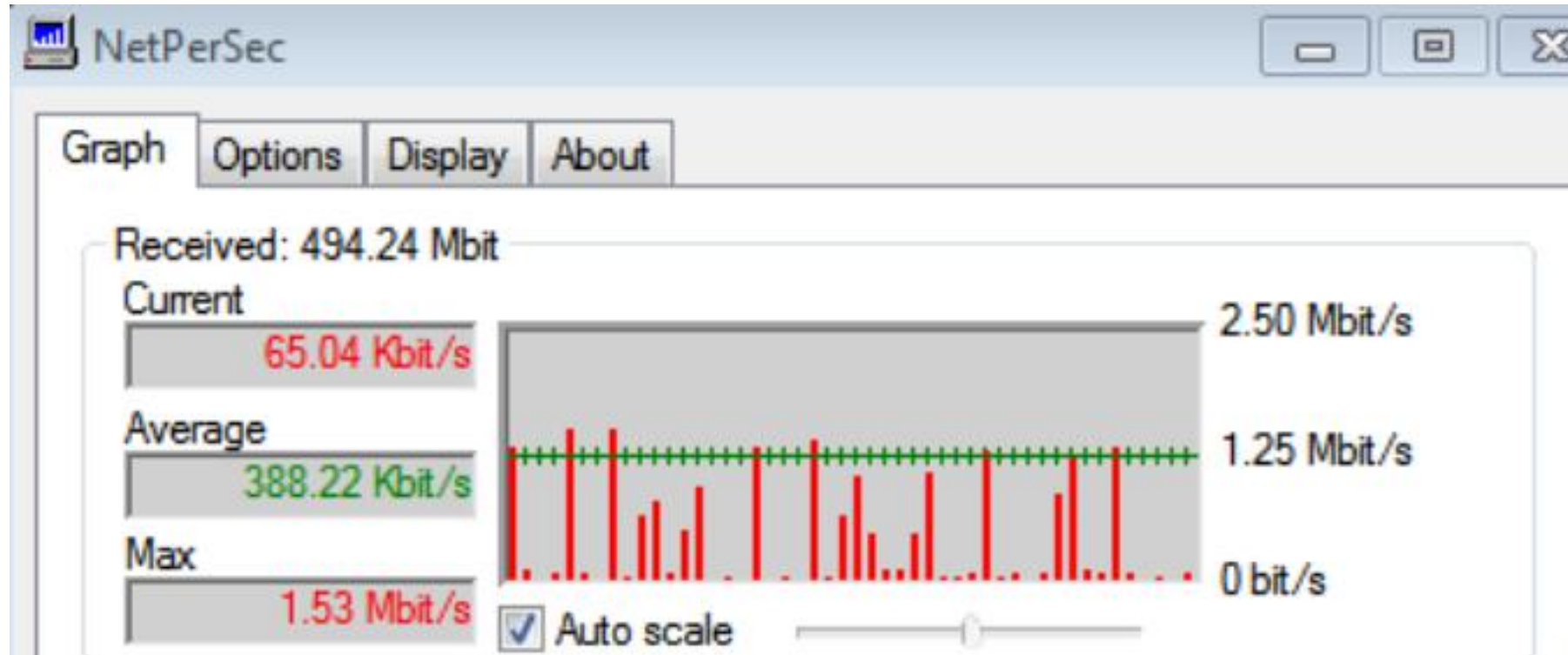
When the bucket full?



EXAMPLE CASE

How data work?

- Without queue



Try to create queue

Simple Queue <queue3>

General Advanced Statistics Traffic Total Total Statistics

Name:

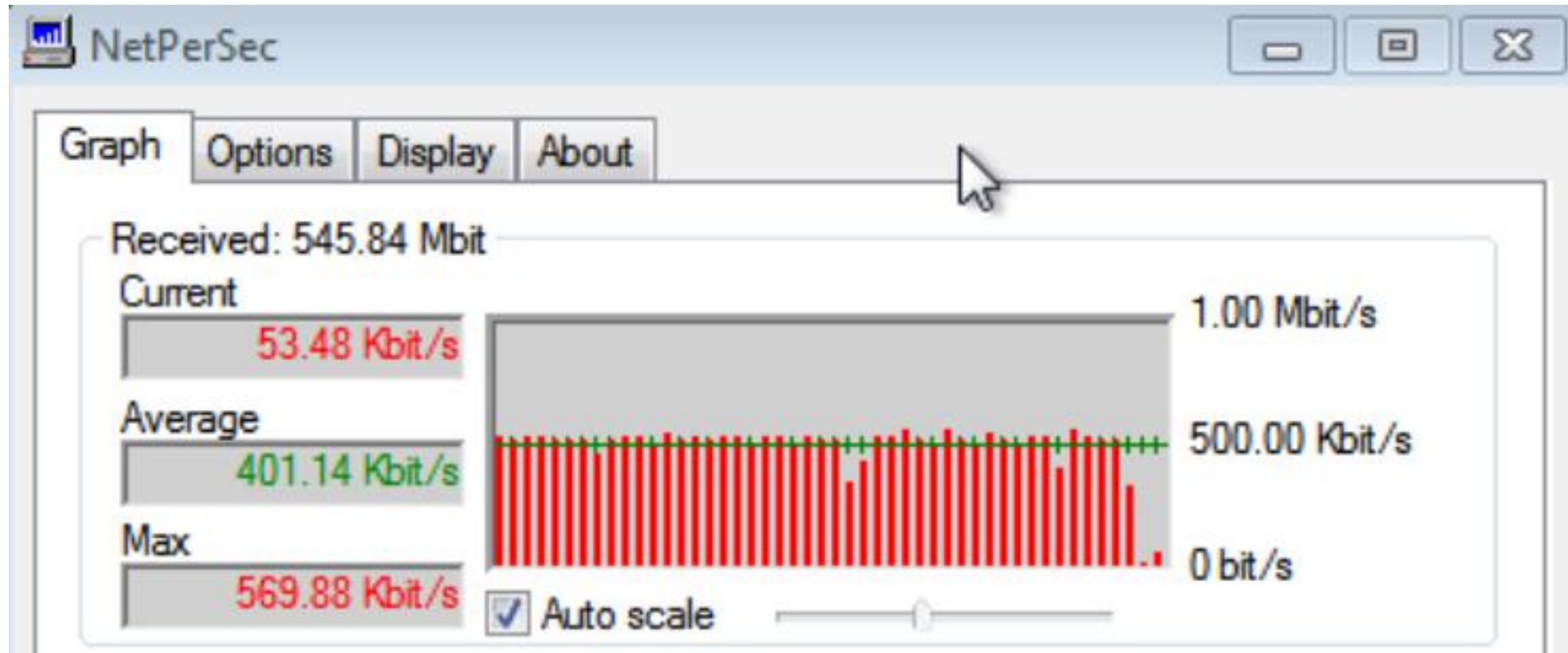
Target:

Dst.:

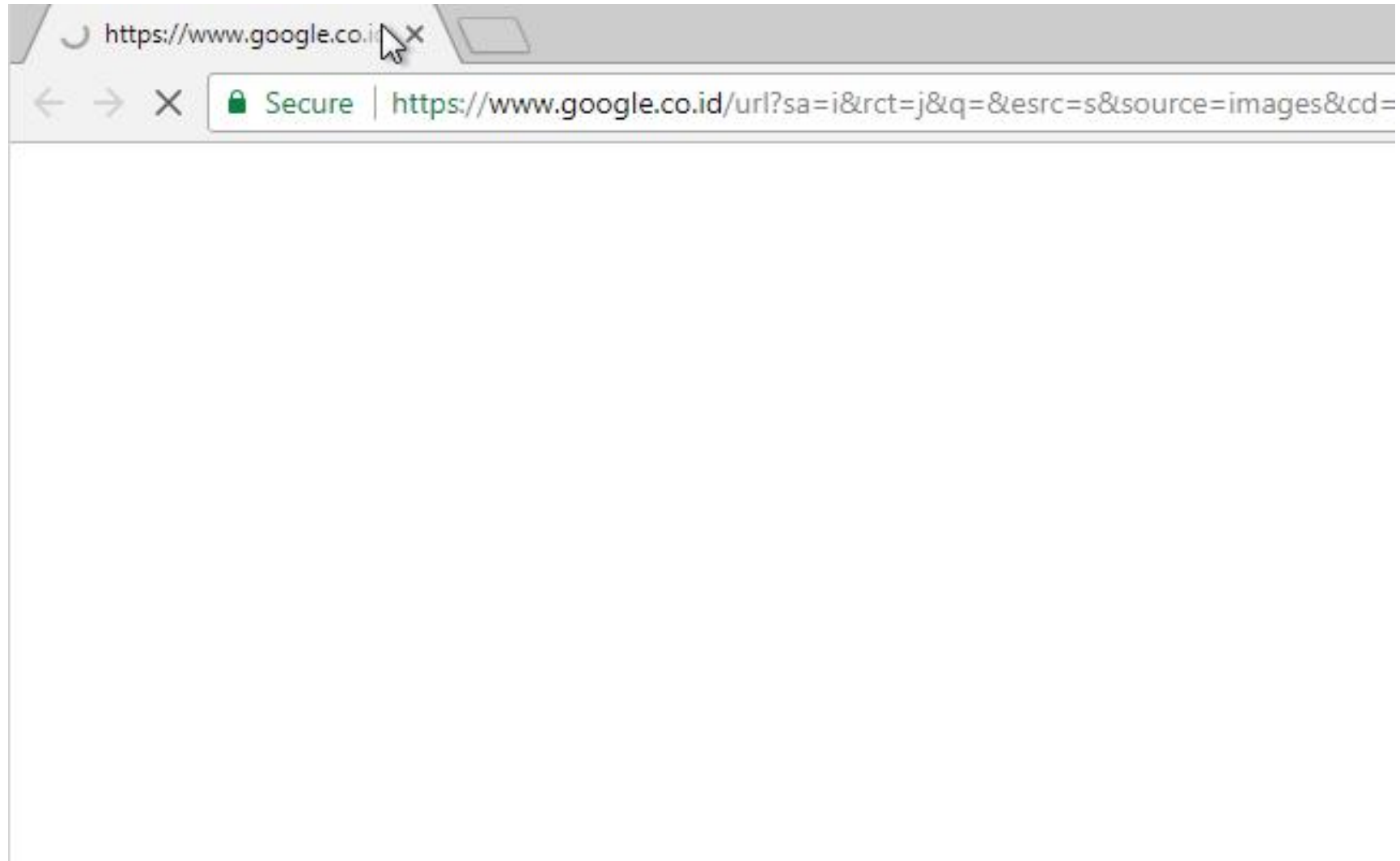
Target Upload Target Download

Max Limit: bits/s

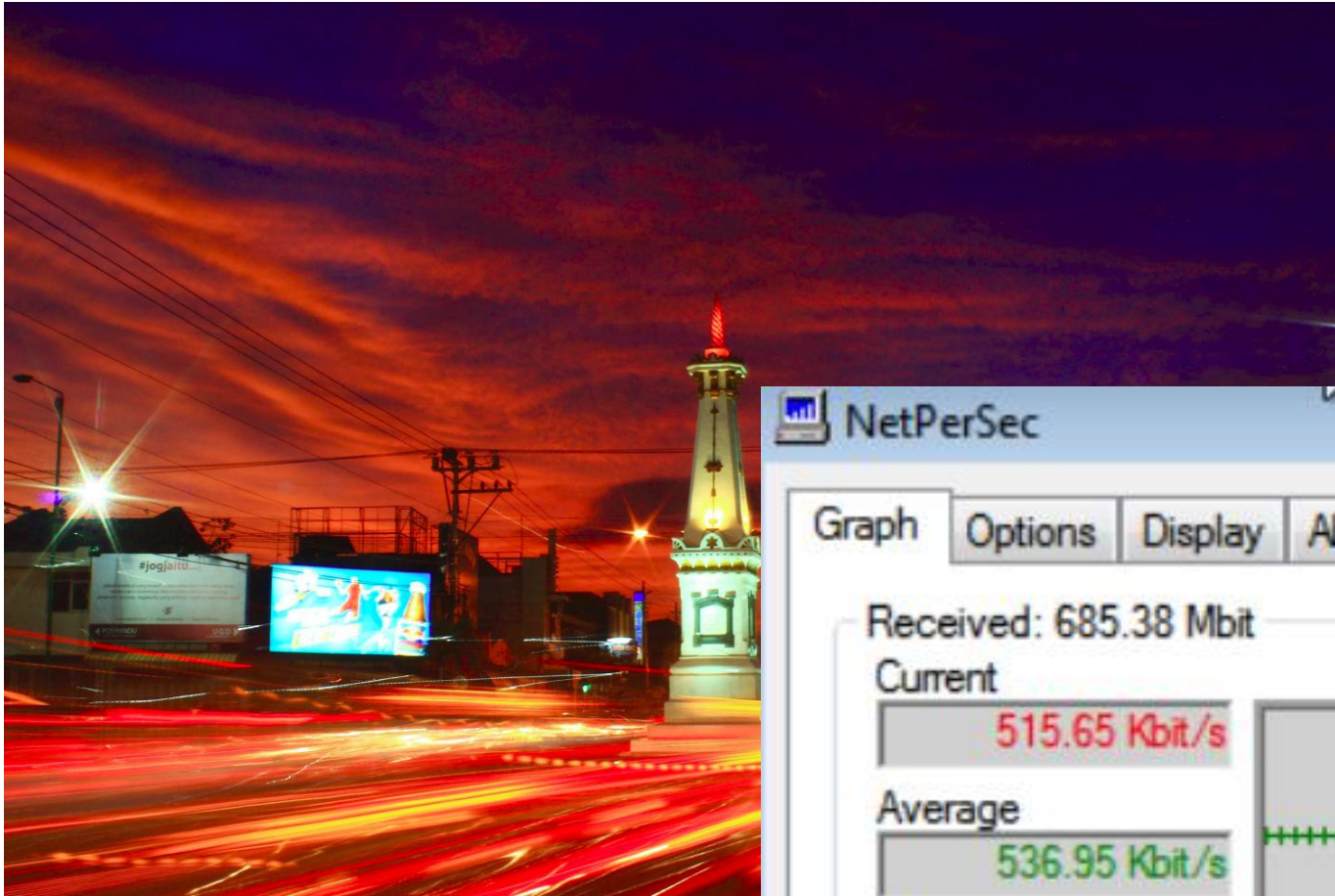
Traffic with queue



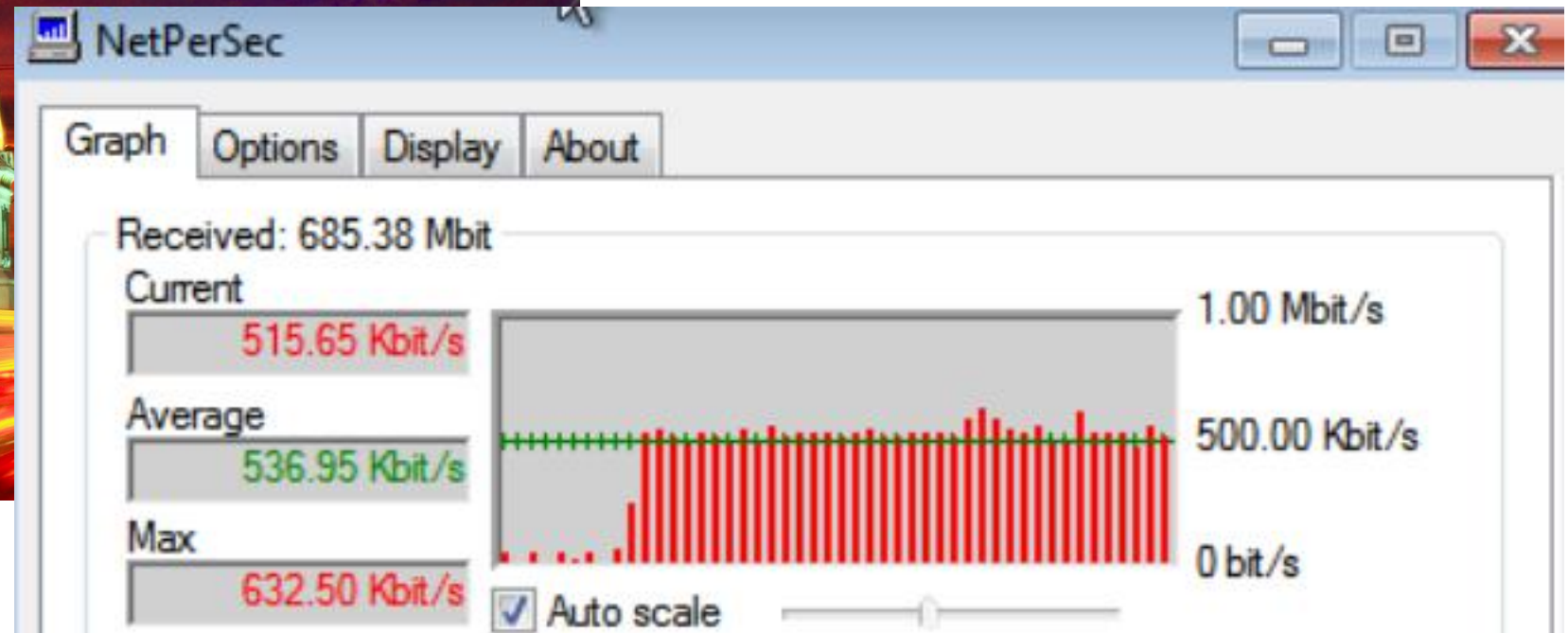
Try to open google



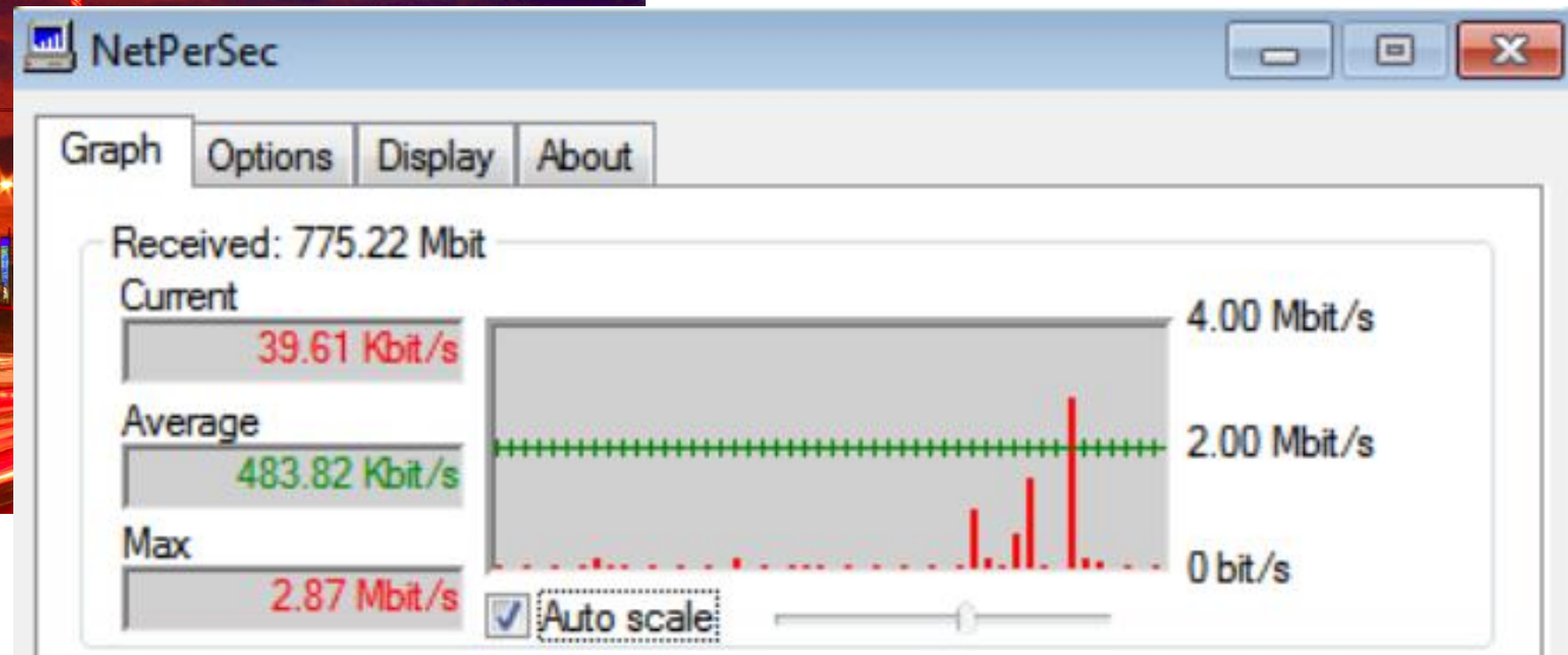
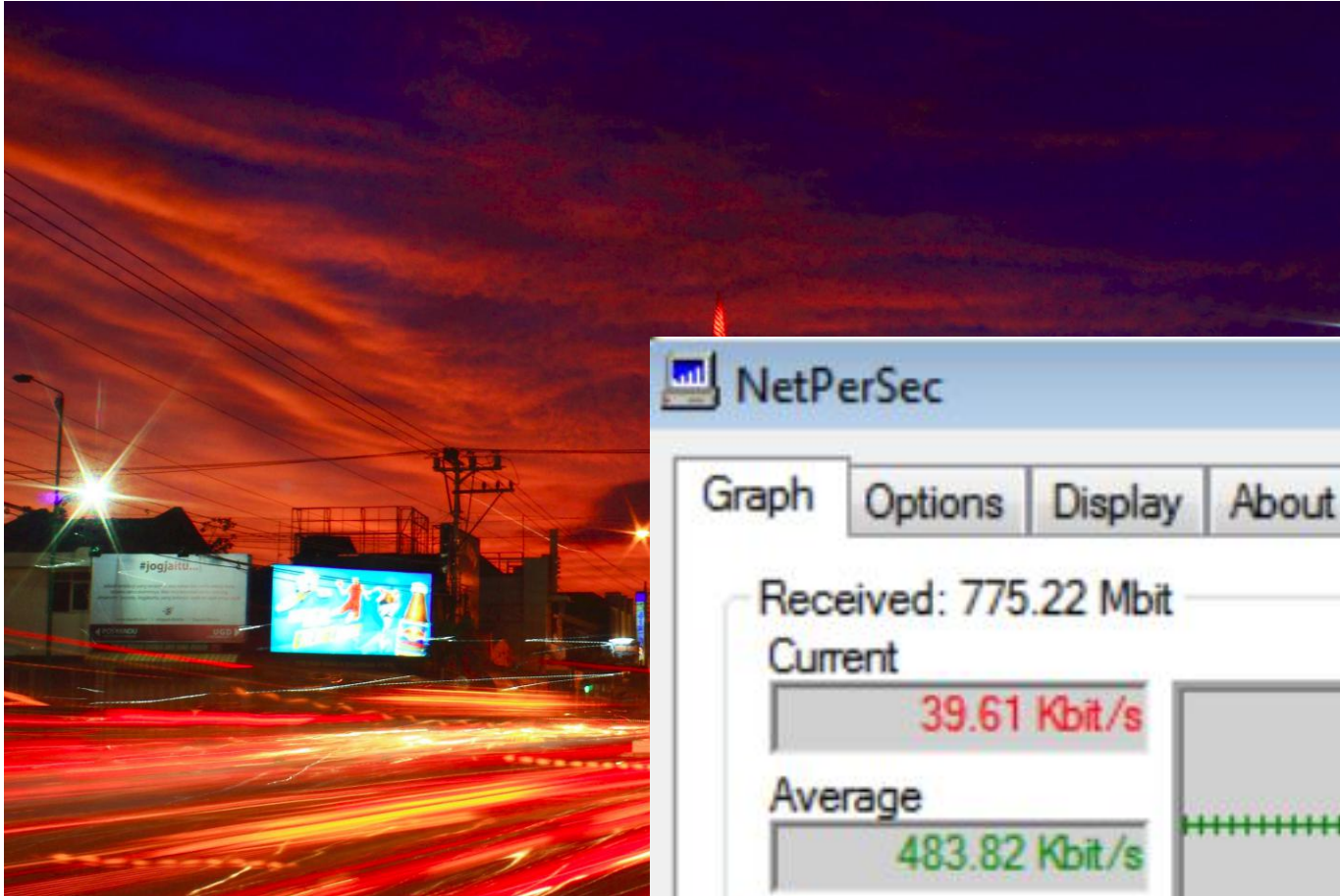
Open a picture



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



Open a picture (without queue)



Modify bucket size

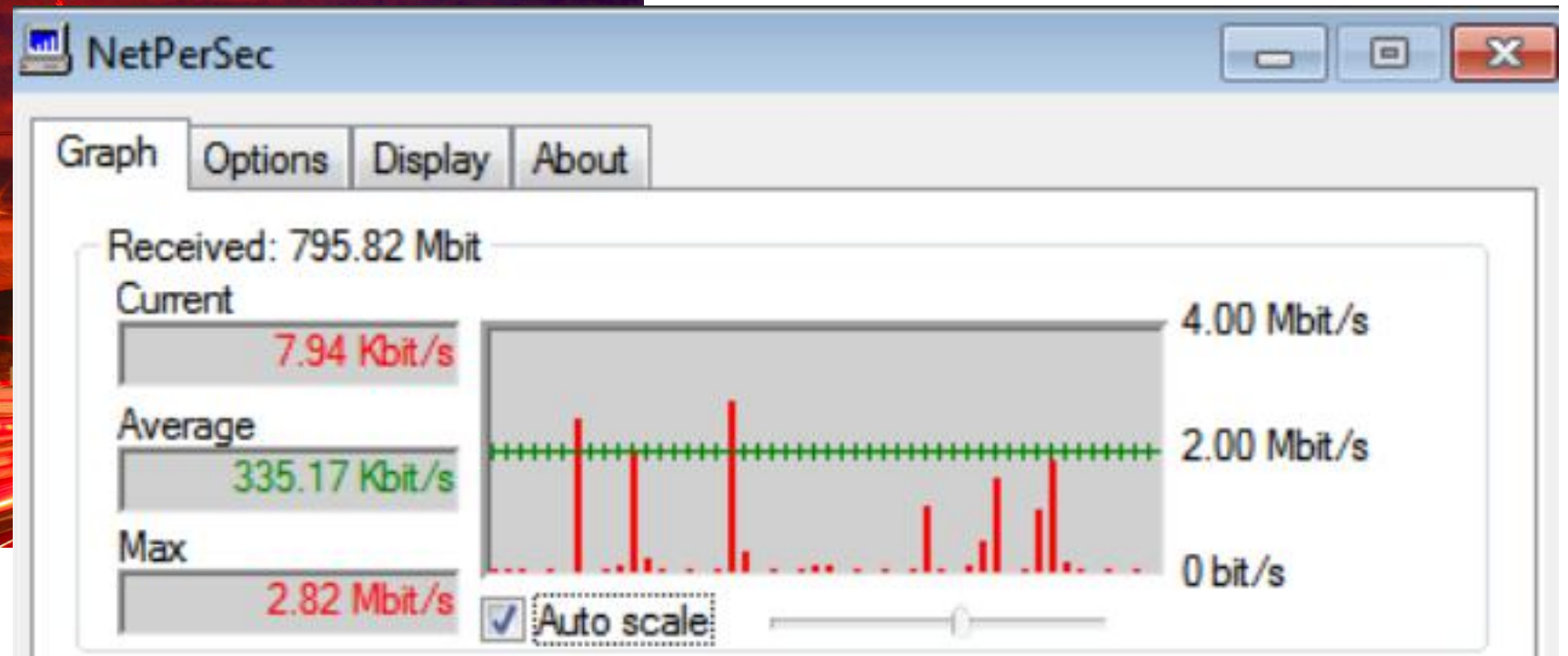
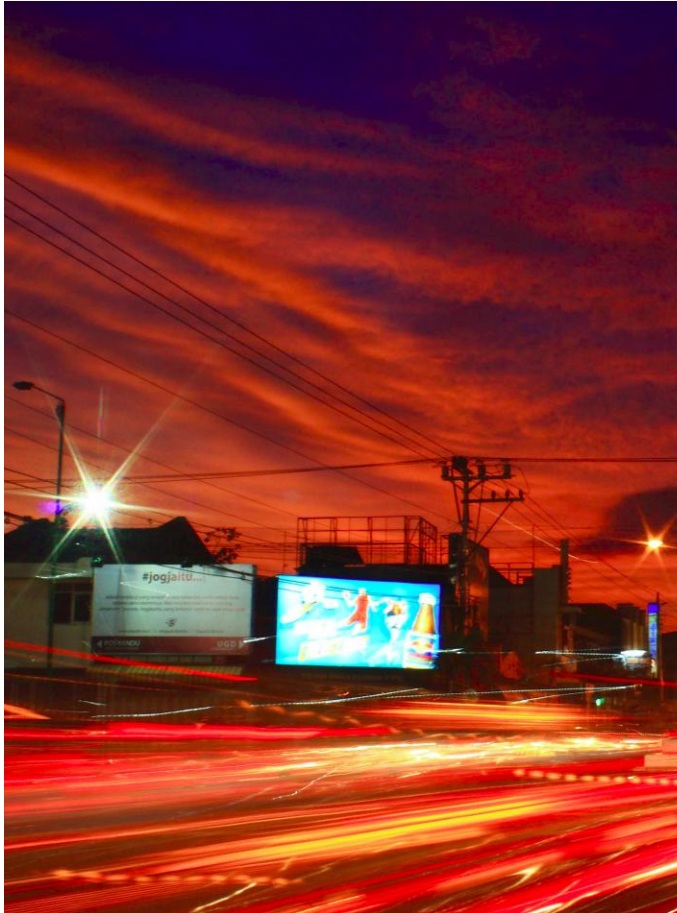
Simple Queue <queue3>

General Advanced Statistics Traffic Total Total Statistics

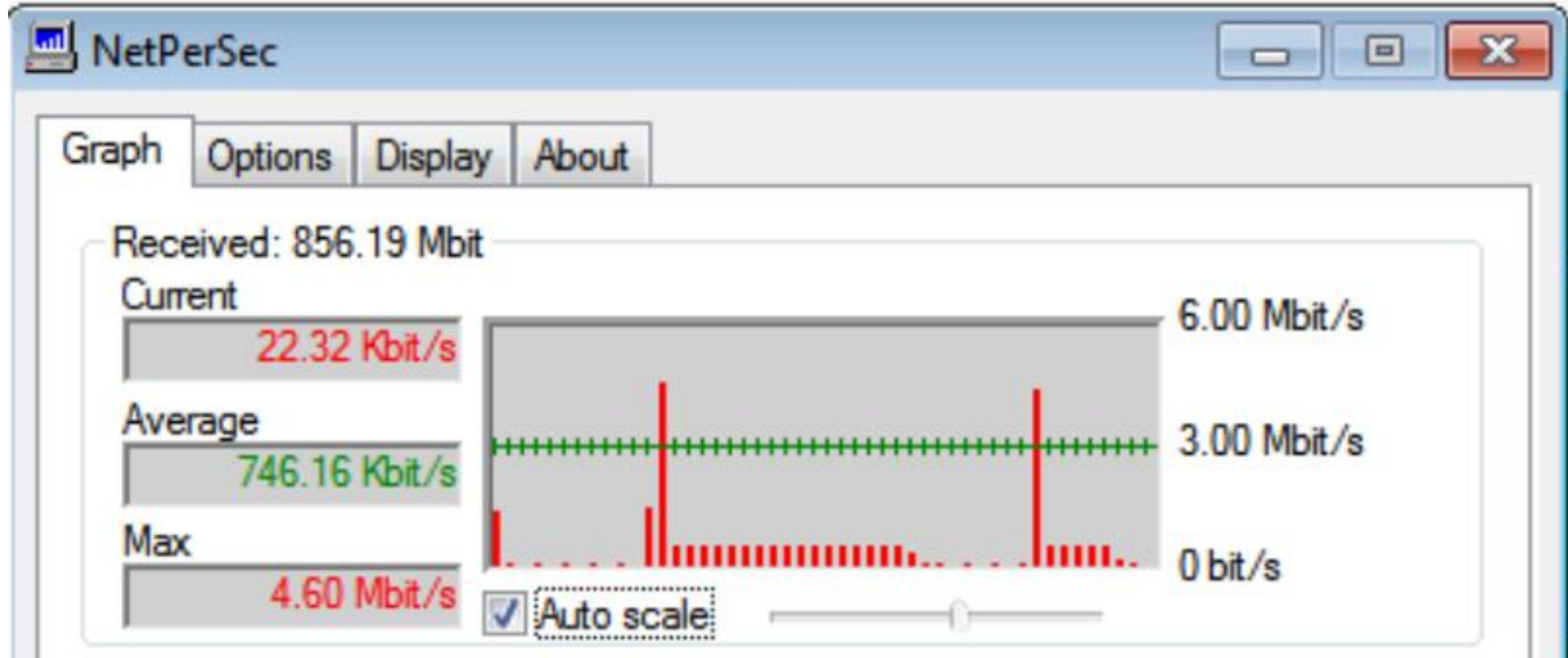
Packet Marks:

	Target Upload	Target Download	
Limit At:	<input type="text" value="unlimited"/>	<input type="text" value="unlimited"/>	bits/s
Priority:	<input type="text" value="8"/>	<input type="text" value="8"/>	
Bucket Size:	<input type="text" value="10.000"/>	<input type="text" value="10.000"/>	ratio
Queue Type:	<input type="text" value="default-small"/>	<input type="text" value="default-small"/>	
Parent:	<input type="text" value="none"/>		

Open a picture



This is how to bucket size work



BUCKET SIZE in HOTSPOT NETWORK

Dynamic Queue

New Hotspot User Profile

General Queue Advertise Scripts

Name: user1-profile

Address Pool: none

Session Timeout:

Idle Timeout: none

Keepalive Timeout: 00:02:00

Status Autorefresh: 00:01:00

Shared Users: 1

Rate Limit (px/bx): 512K/512K

☒ Add MAC Cookie

MAC Cookie Timeout: 3d 00:00:00

OK Cancel Apply Copy Remove

Simple Queue <hs-<hotspot1>>

General Advanced Statistics Traffic Total ...

Packet Marks:

	Target Upload	Target Download
Limit At:	unlimited	unlimited
Priority:	8	8
Bucket Size:	0.100	0.100
Queue Type:	hotspot-default	hotspot-default
Parent:	none	

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
- AutoBackToTitle.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

```
50 vignette.blur = (1-health) * 7 + smokeEffect * 10 + health * 10;
51 vignette.blurDistance = (1-health) * 7 + smokeEffect * 10;
52 vignette.chromaticAberration = heatEffect * 10;
53 }
54
55
56 void OnTriggerStay(Collider c)
57 {
58     var fire = c.GetComponent<Fire>();
59     if (fire && fire.alive)
60     {
61         float dist = 1-(((transform.position - fire.transform.position).magnitude));
62         NearHeat(dist);
63     }
64
65     var smoke = c.GetComponent<SmokeParticle>();
66     if (smoke && smoke.GetComponent<ParticleSystem>().isActive)
67     {
68         float dist = 1-(((transform.position - smoke.transform.position).magnitude));
69         NearSmoke(dist);
70     }
71 }
72
73
74 void OnCollisionEnter(Collision c)
75 {
76     healthBox = c.gameObject.GetComponent<HealthBox>();
```


Manipulate Bucket Size

Hotspot User Profile <user1-profile>

General Queue Advertise Scripts

Name: user1-profile

Address Pool: none

Session Timeout:

Idle Timeout: none

Keepalive Timeout: 00:02:00

Status Autorefresh: 00:01:00

Shared Users: 1

Rate Limit (rx/tx):

Hotspot User Profile <user1-profile>

General Queue Advertise Scripts

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 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:	<input type="text" value="unlimited"/>	<input type="text" value="unlimited"/>	bits/s
Priority:	<input type="text" value="8"/>	<input type="text" value="8"/>	
Bucket Size:	<input type="text" value="10.000"/>	<input type="text" value="10.000"/>	ratio
Queue Type:	<input type="text" value="default-small"/>	<input type="text" value="default-small"/>	
Parent:	<input type="text" value="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	$(0+0+0+0+0+0+0+0+0+0+0+0+0+0+1024)/16$	64	1024
3	$(0+0+0+0+0+0+0+0+0+0+0+0+0+1024+1024)/16$	128	1024
4	$(0+0+0+0+0+0+0+0+0+0+0+0+1024+1024+1024)/16$	192	1024
5	$(0+0+0+0+0+0+0+0+0+0+1024+1024+1024+1024)/16$	256	1024
6	$(0+0+0+0+0+0+0+0+0+1024+1024+1024+1024+1024)/16$	320	512
7	$(0+0+0+0+0+0+0+0+0+512+1024+1024+1024+1024+1024)/16$	352	512
8	$(0+0+0+0+0+0+0+0+0+512+512+1024+1024+1024+1024+1024)/16$	384	512
9	$(0+0+0+0+0+0+0+0+0+512+512+512+1024+1024+1024+1024+1024)/16$	416	512
10	$(0+0+0+0+0+0+0+0+0+512+512+512+512+1024+1024+1024+1024+1024)/16$	448	512
11	$(0+0+0+0+0+0+0+0+0+512+512+512+512+512+1024+1024+1024+1024+1024)/16$	480	512
12	$(0+0+0+0+0+0+0+0+0+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16$	512	512
13	$(0+0+0+0+0+0+0+0+0+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16$	544	512
14	$(0+0+0+0+0+0+0+0+0+512+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16$	576	512
15	$(0+0+0+0+0+0+0+0+0+512+512+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16$	608	512
16	$(0+0+0+0+0+0+0+0+0+512+512+512+512+512+512+512+512+512+512+1024+1024+1024+1024+1024)/16$	640	512





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