

The logo consists of three teardrop-shaped elements arranged in a fan-like pattern around the text. The top-left and top-right elements are dark blue, while the bottom element is a lighter blue. The background features large, overlapping curved shapes in shades of blue and grey.

# SmartEye

**Nicky Verslycken**

**QoS for streaming and live internet calls**



- Router basic configuration
  - WAN dhcp client
  - DHCP server
  - DNS
  - NAT
- Firewall mangle rules and address lists
- QoS
- Queue Types & Tree

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General information



### Communication channel

You can chat in the group and get general information in the Discord channel I created for this 1 hour course.

Name: **NV-TTT**

URL: <https://discord.gg/CdD4TyWh9V>



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General information

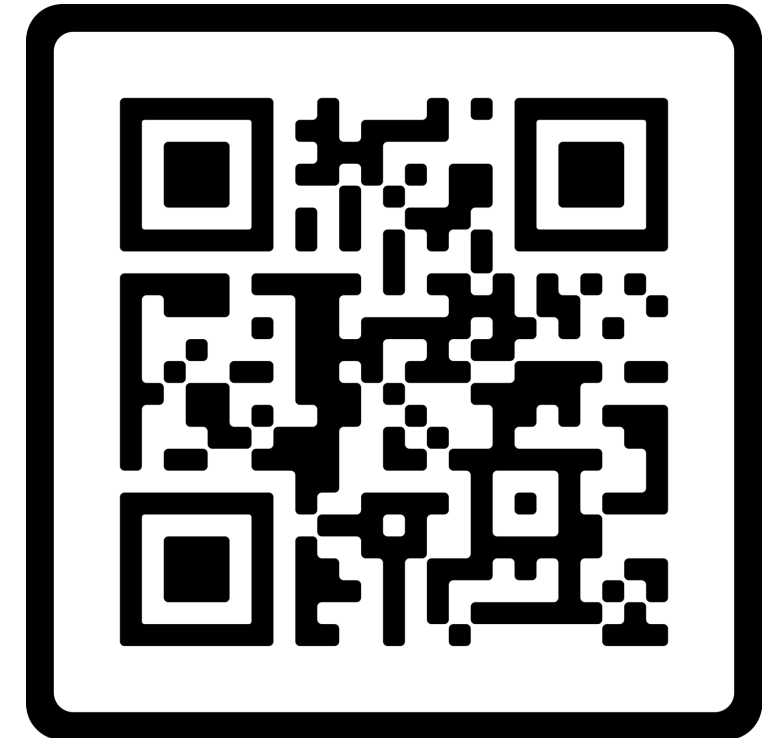
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### Script repository

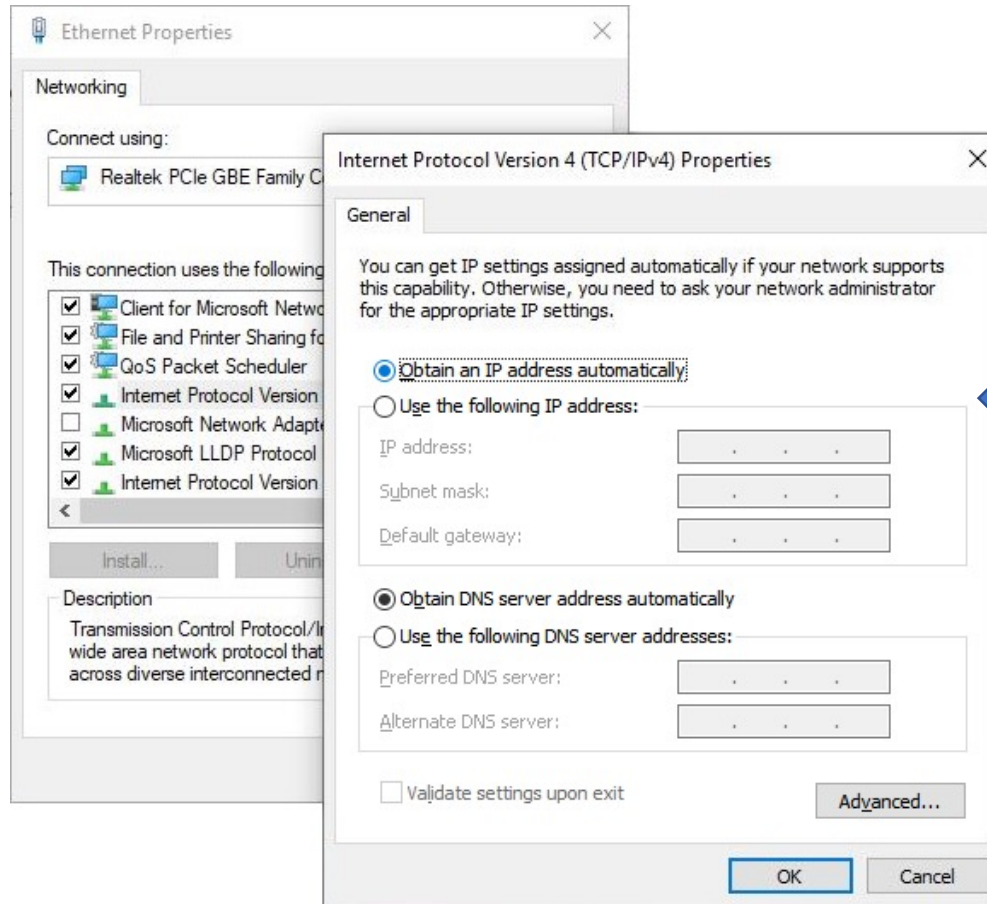
On Github I created a repository with all the scripts you need in this 1h course.  
*(You can find this info also in the Discord channel)*

Name: **MKT-TTT-QoS**

URL: <https://github.com/NickyVerslycken/MKT-TTT-QoS>



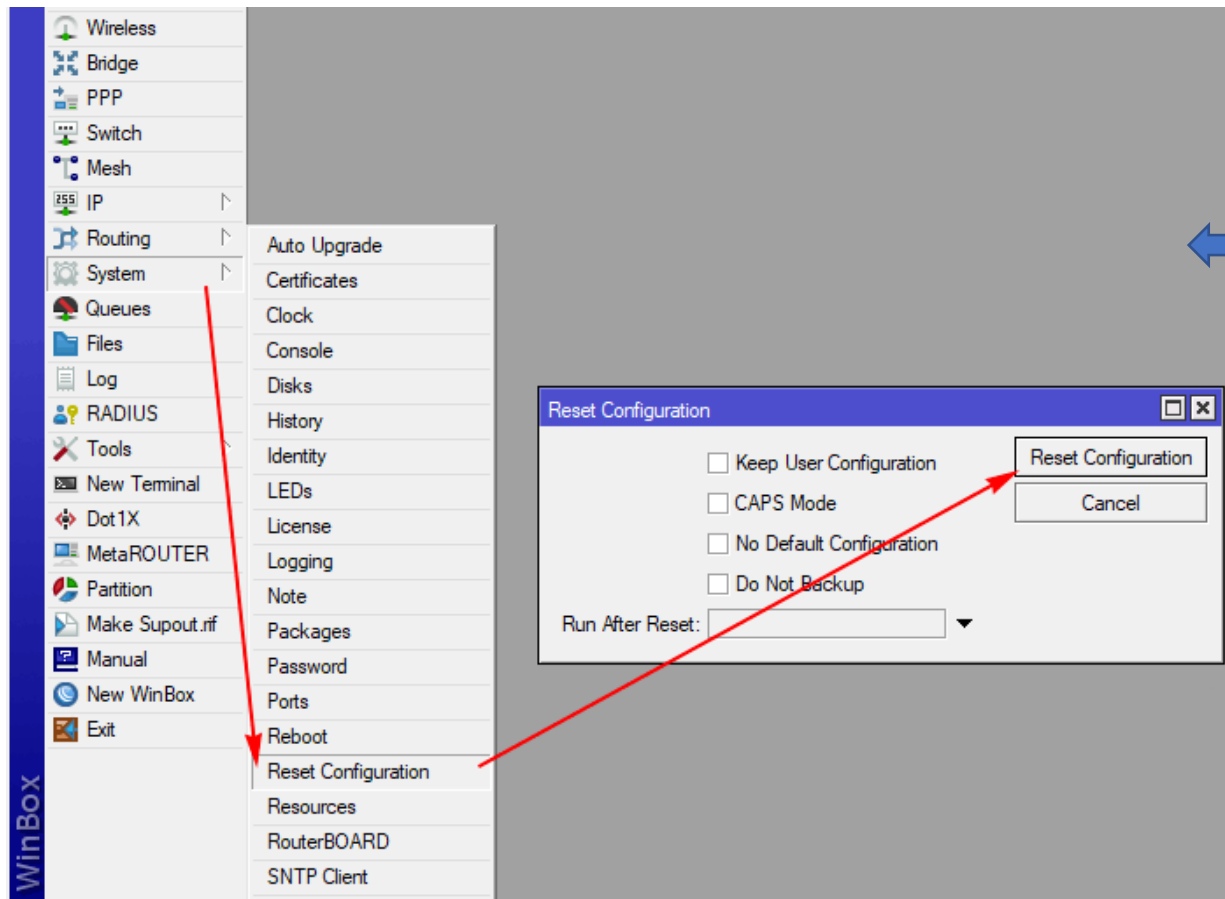
Configure the network adapter of your notebook as needed



Local Network example for a Windows computer:

- *IP Address: 192.168.88.6*
- *Subnet Mask: 255.255.255.0*
- *Default Gateway: 192.168.88.1*
- *Preferred DNS server: 192.168.88.1*

## Reset your Mikrotik router without keeping any configuration



### Reset router:

*Connect your UTP cable to your computer to ether 2 of your router*

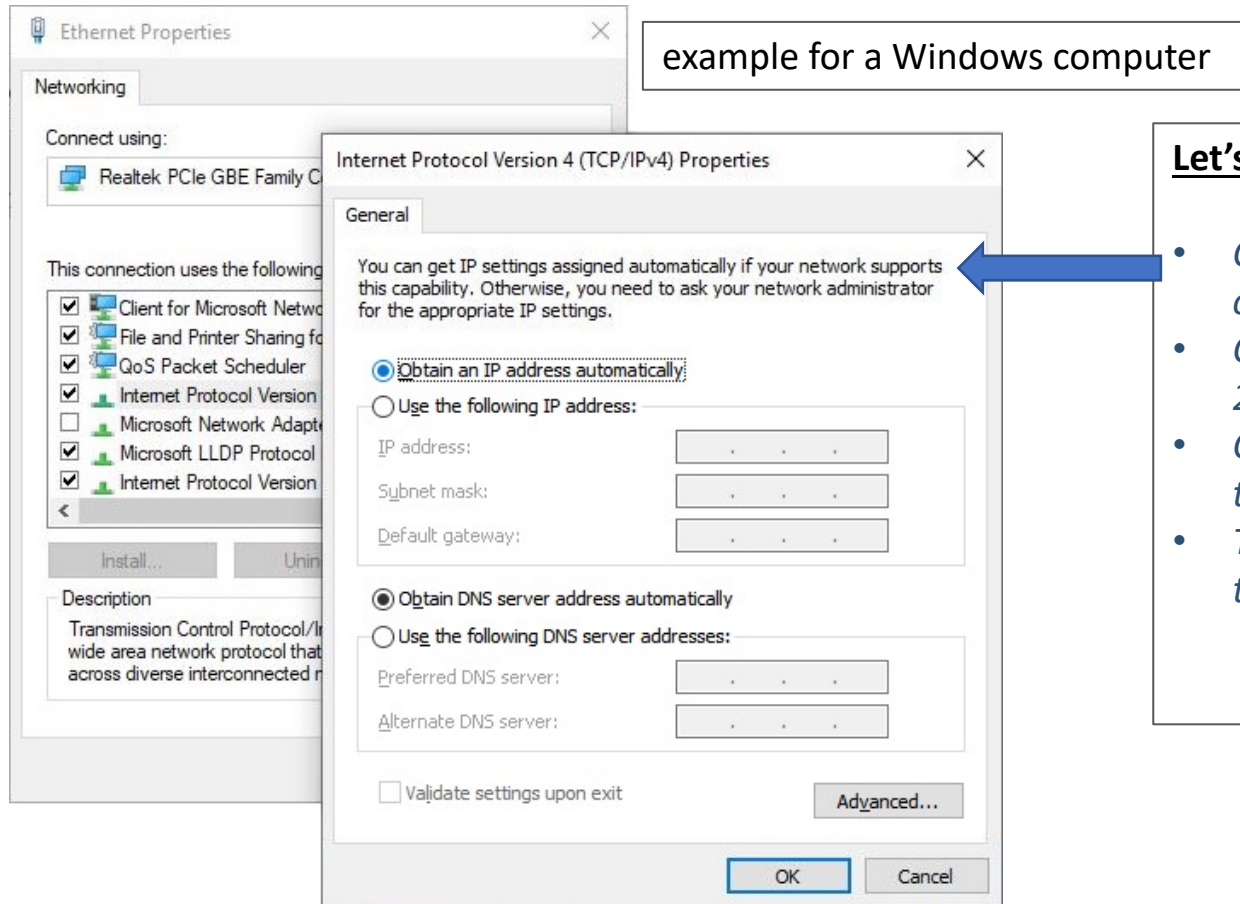
### **Reset in Winbox**

- Check following boxes:
  - *No Default Configuration*
  - *Do Not Backup*

OR

### **Reset with CLI**

```
[admin@Mikrotik] > system
[admin@Mikrotik] /system> reset-configuration\
\... keep-users=no no-defaults=yes skip-backup=yes
```



### Let's connect

- *Connect your UTP cable to the internet on ether 1 of your router*
- *Connect your UTP cable to your computer to ether 2 of your router*
- *Configure your network adapter on your computer to obtain the IP and DNS settings automatically*
- *Test or internet work by opening fast.com (oops there go's our internet speed)*

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**Load the “basic-configuration” script form github on your router**

... change the value of the variable studentnumber to your number

After loading up the configuration you can use following info to connect:

- Router login:
  - User: admin
  - Password: Myrouter1
- WiFi:
  - SSID 2.4GHz: TS<studentnumber>-2
  - SSID 5GHz: TS<studentnumber>-5
  - PSK: mysecurewifi



```
[admin@TS01] > interface monitor-traffic ether1,bridgel
      name:      ether1      bridgel
rx-packets-per-second:      11 903      3 138
rx-bits-per-second:      122.1Mbps      2.1Mbps
fp-rx-packets-per-second:      11 844      3 125
fp-rx-bits-per-second:      121.1Mbps      2.0Mbps
rx-drops-per-second:      0      0
rx-errors-per-second:      0      0
tx-packets-per-second:      3 126      11 853
tx-bits-per-second:      2.2Mbps      121.2Mbps
fp-tx-packets-per-second:      0      0
fp-tx-bits-per-second:      0bps      0bps
tx-drops-per-second:      0      0
tx-queue-drops-per-second:      0      0
tx-errors-per-second:      0      0
-- [Q quit|D dump|C-z pause]
```

### Test some speed

*Please open a high-resolution video and check your bandwidth usage*

*You should be able to see a high bandwidth usage, especially when buffering a HD, 4K or higher video*

**Recommended bandwidth for Youtube as example**

Type	Video Bitrate, Standard Frame Rate (24, 25, 30)	Video Bitrate, High Frame Rate (48, 50, 60)
8K	100 - 200 Mbps	150 to 300 Mbps
2160p (4K)	44–56 Mbps	66–85 Mbps
1440p (2K)	20 Mbps	30 Mbps
1080p	10 Mbps	15 Mbps
720p	6.5 Mbps	9.5 Mbps
480p	2.5 Mbps	4 Mbps
360p	1 Mbps	1.5 Mbps



```
1: /ip firewall mangle
```

```
2: # mark connection of streaming services
```

```
#youtube:youtube
add action=mark-connection chain=prerouting\
connection-mark=no-mark connection-state=new\
log=yes log-prefix=cm_streaming_youtube\
new-connection-mark=cm_streaming passthrough=yes protocol=udp\
comment="Connection-mark streaming:youtube" content="youtube"\
#youtube:googlevideo
add action=mark-connection chain=prerouting\
connection-mark=no-mark connection-state=new\
log=yes log-prefix=cm_streaming_youtube\
new-connection-mark=cm_streaming passthrough=yes protocol=udp\
comment="Connection-mark streaming:youtube" content="googlevideo"
```

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Firewall mangle rules and address lists

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You can use the script “QoS-mangle-rules” on github to add some more rules



```
3: /ip firewall mangle
```

```
4: # add streaming server to address list
```

```
add action=add-dst-to-address-list\  
address-list=addr-l_streaming address-list-timeout=3\  
chain=prerouting connection-mark=cm_streaming log=yes\  
log-prefix=addr-l_streaming comment=\  
"Add streaming destination IP to the address list addr-l_streaming"
```

```
5: /ip firewall mangle
```

```
6: # add packet mark for streaming
```

```
add action=mark-packet chain=prerouting\  
comment="Packet mark streaming" dst-address-list=addr-l_streaming\  
log=yes log-prefix=pm_streaming new-packet-mark=pm_streaming\  
passthrough=yes
```



```
7: /ip firewall mangle
```

```
8: # mark connection of live video and audio calls

add action=mark-connection chain=prerouting\
comment="Connection-mark live-video-audio" connection-mark=no-mark\
connection-state=new dst-address-list=!addr-l_streaming\
log=yes log-prefix=cm_live-video-audio\
new-connection-mark=cm_live-video-audio passthrough=yes protocol=udp
```

```
9: /ip firewall mangle
```

```
10: # add address of live video or audio call to the address list

add action=add-dst-to-address-list\
address-list=addr-l_live-video-audio address-list-timeout=4h\
chain=prerouting comment="Add live video or audio call\destination
IP to the address list addr-l_live-video-audio"\
connection-mark=cm_live-video-audio\
log=yes log-prefix=addr-l_live-video-audio
```



```
11: /ip firewall mangle
```

```
12: # add packet mark for live video or audio calls
```

```
add action=mark-packet chain=prerouting\  
comment="Packet-mark live-video-audio"\  
dst-address-list=addr-l_live-video-audio\  
log=yes log-prefix=pm_live-video-audio\  
new-packet-mark=pm_live-video-audio passthrough=yes protocol=udp
```

## QoS

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1.Simple Queue: This is the simplest type of queue, where you can limit the maximum bandwidth for a single IP address, subnet or protocol. It's useful for small networks with few users.

2.Queue Tree: This type of queue allows you to prioritize and control bandwidth for multiple subnets, protocols, or IP addresses. It's more flexible than the simple queue and can be used for larger networks with more complex traffic shaping requirements.

3.PCQ (Per Connection Queue): This type of queue is designed to balance the available bandwidth among multiple connections from the same IP address or subnet. It's useful for situations where multiple users share the same internet connection.

4.Burst Queue: This type of queue allows you to give a temporary burst of bandwidth to a specific IP address or subnet when it's available. It can be used to improve the performance of time-sensitive applications such as VoIP or video streaming.

Overall, the type of queue you choose depends on the specific needs of your network and the traffic shaping requirements you want to implement.

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Simple queues and queue tree

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Now we will configure our Queues, They can be configured in Simple Queues or Queue Tree with the same effect but we will use Queue Tree in this case.

If we have time left we can configure them in Simple Queue as well,

```
/queue type
```

```
add kind=pcq name=streaming-pcq pcq-burst-rate=10M\  
pcq-burst-threshold=2M pcq-burst-time=1m pcq-classifier=dst-address\  
pcq-rate=2M
```

```
add kind=pcq name=live-calls-pcq pcq-burst-rate=10M\  
pcq-burst-threshold=6M pcq-burst-time=1m pcq-classifier=dst-address\  
pcq-rate=6M
```

```
add kind=pcq name=other-pcq pcq-burst-rate=10M\  
pcq-burst-threshold=5M pcq-burst-time=1m pcq-classifier=dst-address\  
pcq-rate=5M
```

```
/queue tree  
  
add name=QT-ether1-wan parent=bridge-LAN priority=1  
  
add name=QT-streaming packet-mark=pm_streaming parent=QT-ether1-wan\  
queue=streaming-pcq  
  
add name=QT-live-calls packet-mark=pm_live-video-audio\  
parent=QT-ether1-wan priority=1 queue=live-calls-pcq  
  
add name=QT-other packet-mark=no-mark parent=QT-ether1-wan\  
priority=2 queue=other-pcq
```

Now we will do following testing and check our quality and bandwidth usage

1: Open a Youtube movie

2: Start a videocall, preferable over WhatsApp or Facebook Messenger to a college or a loved one

3: Start surfing on the web, preferable on heavy websites like.

Examples:

- <https://eng.lsm.lv>
- [https://www.baltictimes.com/news\\_latvia](https://www.baltictimes.com/news_latvia)

Most news website are pretty heavy to load.

Queue List

Simple Queues

Interface Queues

Queue Tree

Queue Types