MIKROTIK QUALITY OF SERVICE IN WIRELESS BRIDGE PTP LINK

By

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MikroTik User Meeting, 30th January 2018

Nairobi (Kenya)

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About Company:

TriStar Technologies

Director & Senior Executive
Network Consultant

Sale & service:

MikroTik

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TOTO LINK
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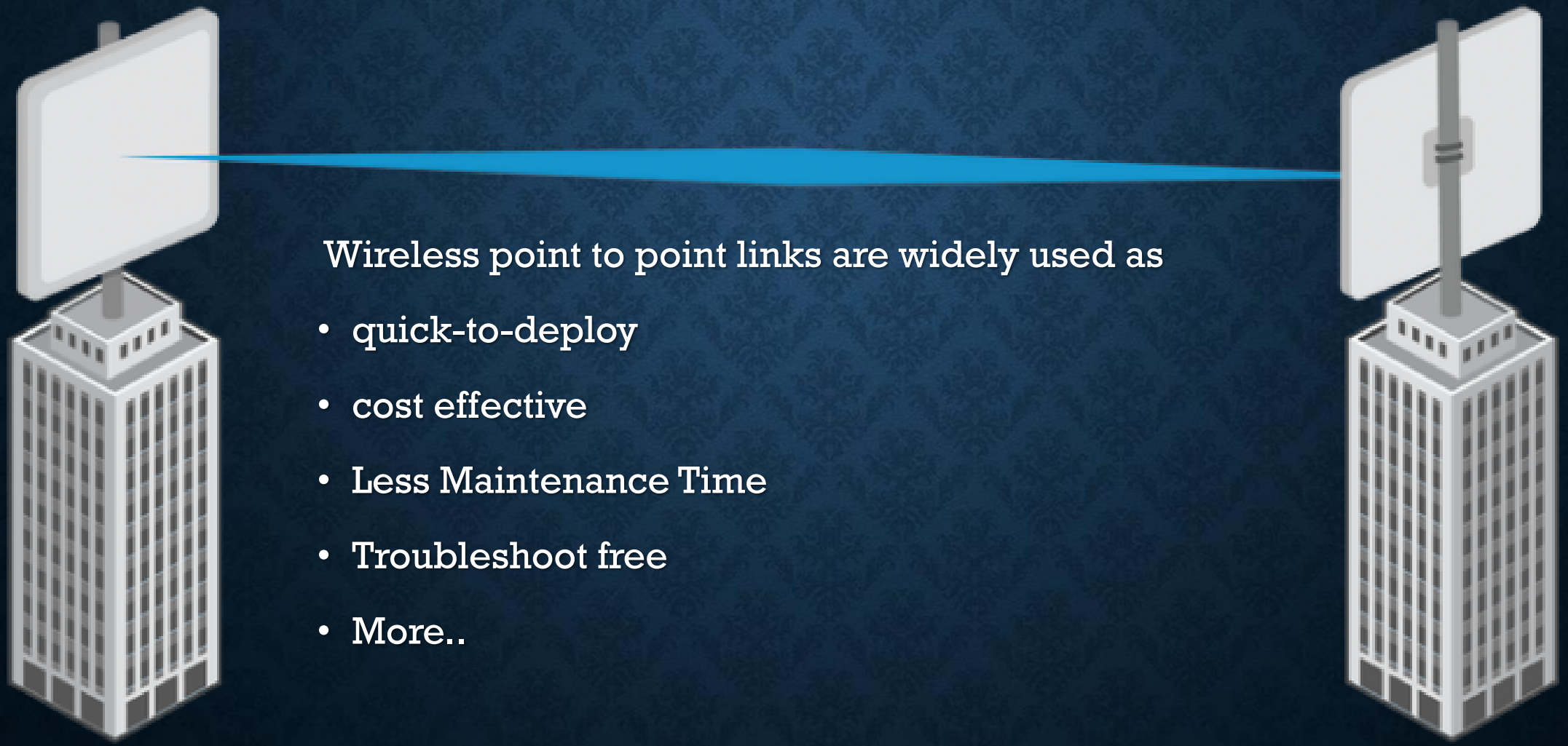
OUTLINES

1. Wireless Problems in Congested Environment.
2. Solution with MikroTik ROS
3. How does it work in MikroTik?
4. Configuration to be used
5. My Successful Project Story
6. MikroTik ROS Configuration Steps
7. Conclusion

WIRELESS BRIDGE PTP LINK ????



Wireless point to point links are widely used as

- quick-to-deploy
- cost effective
- Less Maintenance Time
- Troubleshoot free
- More..

CONGESTED ENVIRONMENT

SITE SURVEY

Scanned Frequencies >

Graphical View

Search

MAC ADDRESS ↑	SSID	DEVICE NAME	RADIO MODE	ENCRYPTION	SIGNAL/NOISE, dBm	FREQUENCY, GHz
00:15:6D:63:F6:EE	MTY		802.11a	NONE	-84 / -103	5.68
00:27:22:F4:73:A2	K-S-B		802.11n	NONE	-85 / -103	5.7
04:18:D6:38:E9:16	netsat.1		802.11n	NONE	-59 / -94	5.78
04:18:D6:58:82:9C	SC TW Levis2		802.11n	NONE	-81 / -96	5.785
04:18:D6:58:84:A2	AP5642		802.11n	NONE	-82 / -99	5.52
04:18:D6:A6:65:F7	Trafco		802.11n	NONE	-79 / -102	5.695
04:18:D6:E8:9A:BD	AP150		802.11n	NONE	-79 / -100	5.56
24:A4:3C:66:69:2F	AMCO Paints		802.11n	WPA	-84 / -100	5.805
24:A4:3C:6E:2F:E9	PCSIR-Sect-3		802.11n	NONE	-85 / -103	5.68
24:A4:3C:9E:66:E3	saddam1234		802.11n	NONE	-67 / -102	5.67
24:A4:3C:D6:BB:96			802.11n	NONE	-71 / -99	5.58

SCAN

WIRELESS PROBLEMS IN CONGESTED ENVIRONMENT

SPEED TEST

SELECT DESTINATION IP: 192.168.15.237

USER: ubnt

PASSWORD: ••••••••••

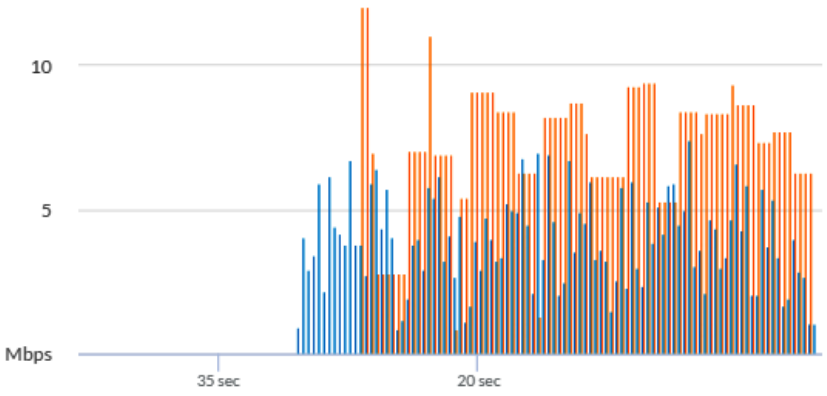
REMEMBER CREDENTIALS FOR THIS SESSION

REMOTE WEB PORT: 80

DIRECTION: Duplex

STOP

DURATION: 30 seconds



STARTED
00:30:000

PING
802.81 ms

TX
6.28 Mbps
avg. 6.32 Mbps

RX
1.05 Mbps
avg. 3.98 Mbps

NETWORK PING

SELECT DESTINATION IP: 192.168.15.10

PACKET COUNT: 50

PACKET SIZE: 56

HOST	TIME	TTL
192.168.15.10	311.13	64
192.168.15.10	344	64
192.168.15.10	311.55	64
192.168.15.10	333.62	64
192.168.15.10	333.83	64
192.168.15.10	Request timeout	
192.168.15.10	Request timeout	
192.168.15.10	Request timeout	
192.168.15.10	Request timeout	
192.168.15.10	Request timeout	

RESULTS

PACKET LOSS 82 %
10 OF 50 PACKETS RECEIVED

MIN 233.62 ms

AVG 802.81 ms

MAX 1446.89 ms

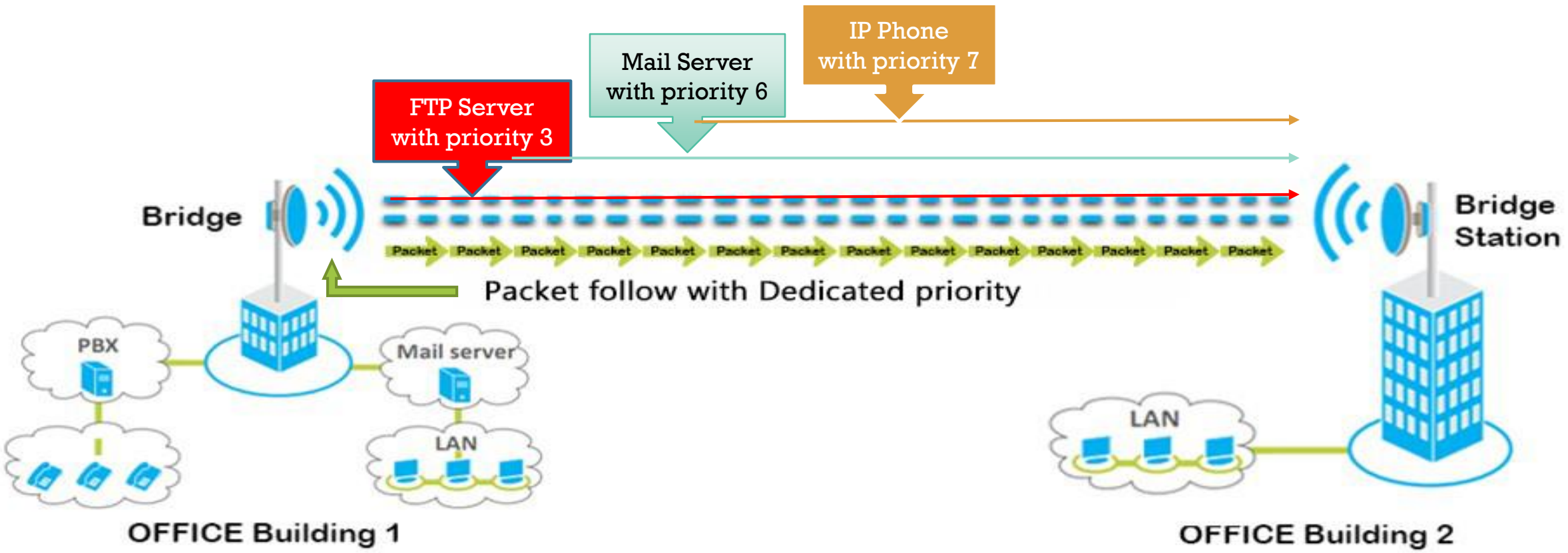
START

SOLUTION WITH MIKROTIK OS

MikroTik Router OS offer a very powerful and extremely flexible QoS in wireless environment.

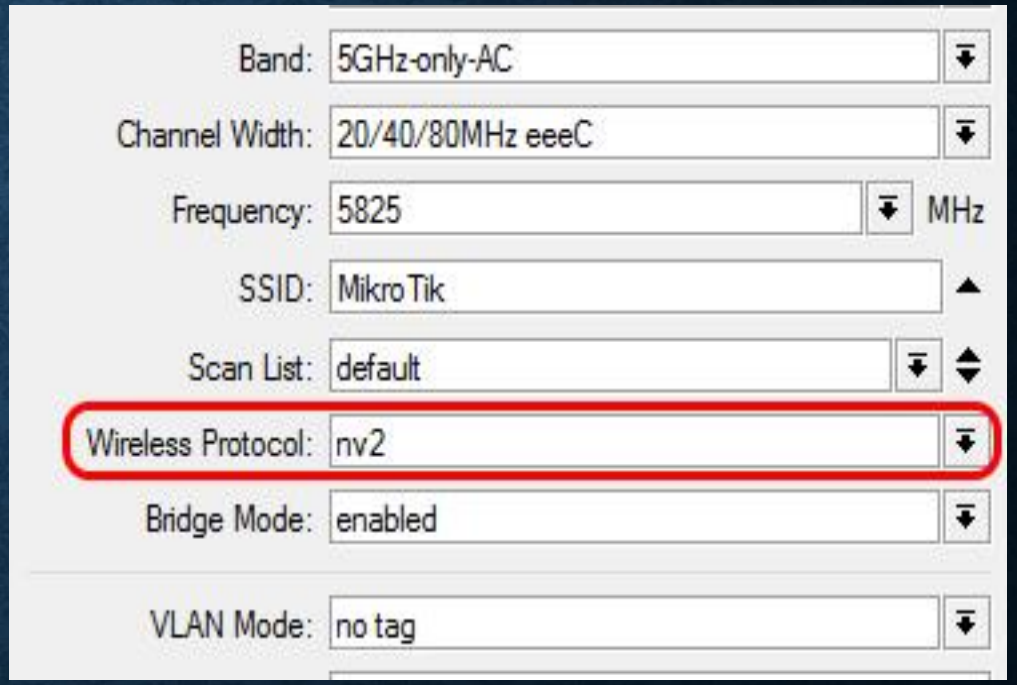
- **Nstream v2 (NV2)** Protocol
- Queues Management
- Frame-Priority

HOW DOES IT WORKS IN MIKROTIK



NV2 PROTOCOL

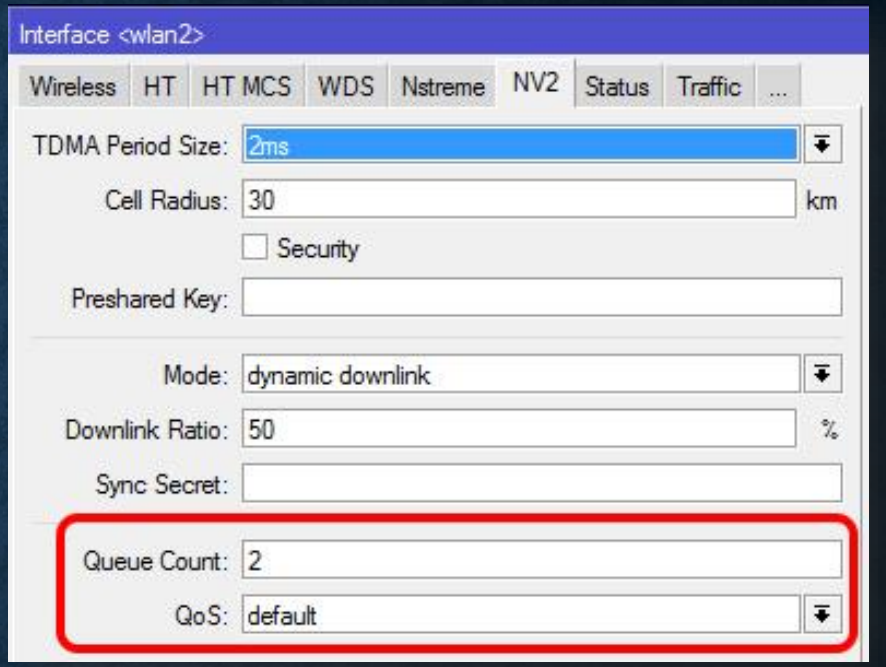
- **Nstream v2 (NV2) is TDMA technology (Time Division Multiple Access) based Wireless PROTOCOL**
- **You can configure Nv2 in the Wireless menu.**



- **The most important benefits of Nv2 are:**
- **Increased speed**
- **More client connections in Point to multi point environments**
- **Lower latency**
- **No distance limitations**
- **No penalty for long distances.**

NV2 WITH QUEUES

- By default (*nv2-qos=default*) NV2 use two queues (*nv2-queue=2*).
- In this mode, all outgoing packets are handled by the integrated QoS algorithm based on packet type and size.



QoS settings are only done on the AP!
There is no need at station end

NV2 QUEUES MANAGEMENT

- We can use 2 (RouterOS default), 4 or 8 separate queues inside a NV2 link for individual traffic classes.
- '**Packet to queue**' depends on the selected number of available NV2 queues (2, 4 or 8 queues)

nv2-queue=2	nv2-queue=4	nv2-queue=8
priority 0,1,2,3 -> queue 0	priority 0,3 -> queue 0	priority 1 -> queue 0
priority 4,5,6,7 -> queue 1	priority 1,2 -> queue 1	priority 2 -> queue 1
	priority 4,5 -> queue 2	priority 0 -> queue 2
	priority 6,7 -> queue 3	priority 3 -> queue 3
		priority 4 -> queue 4
		priority 5 -> queue 5
		priority 6 -> queue 6
		priority 7 -> queue 7

QUEUES BEHAVIOR

To understand this behavior, we have to take a deeper look in the IEEE Standard for 802.1D-2004 Bridge definitions!

User Priority	Acronym	Traffic Type
1	BK	Background
2	./.	Spare
0 (Default)	BE	Best Effort
3	EE	Excellent Effort
4	CL	Controlled Load
5	VI	Video
6	VO	Voice
7	NC	Network Control

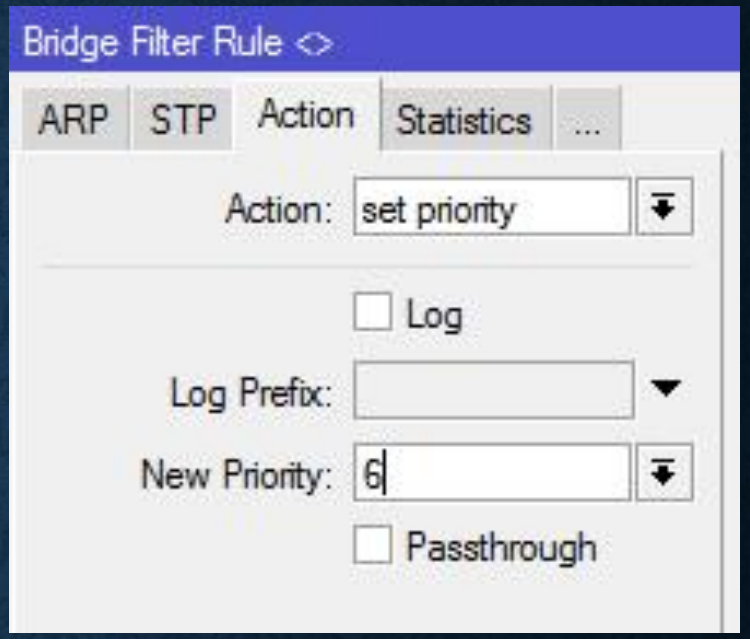
THE FRAME-PRIORITY OPTION

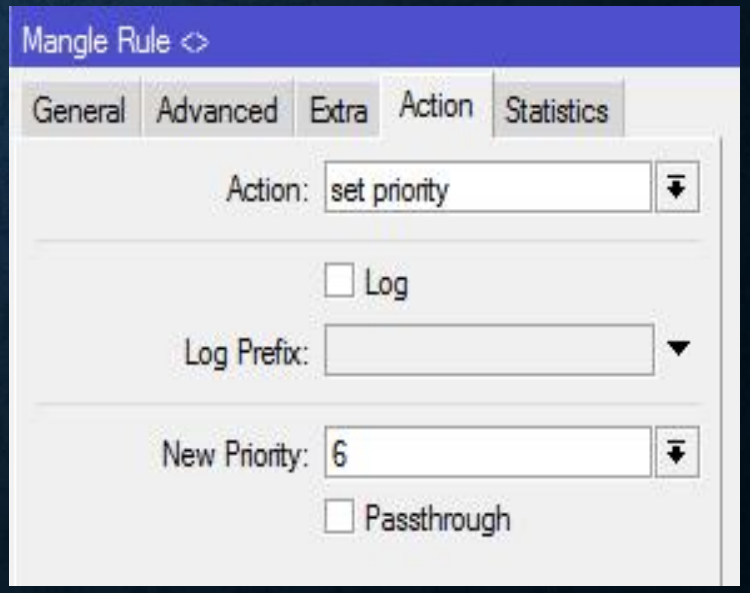
- If the built-in rules do not apply, also in this mode the queuing mechanism use the Frame-Priority field.

THE FRAME-PRIORITY FIELD

- This can easily be done using the ‘action=set-priority’ functionality inside the powerful firewall subsystem of RouterOS which is available for

- Layer2 (in Bridge Filter)
- Layer3 (in IP Firewall Mangle)





CONFIGURATION TO BE USED...

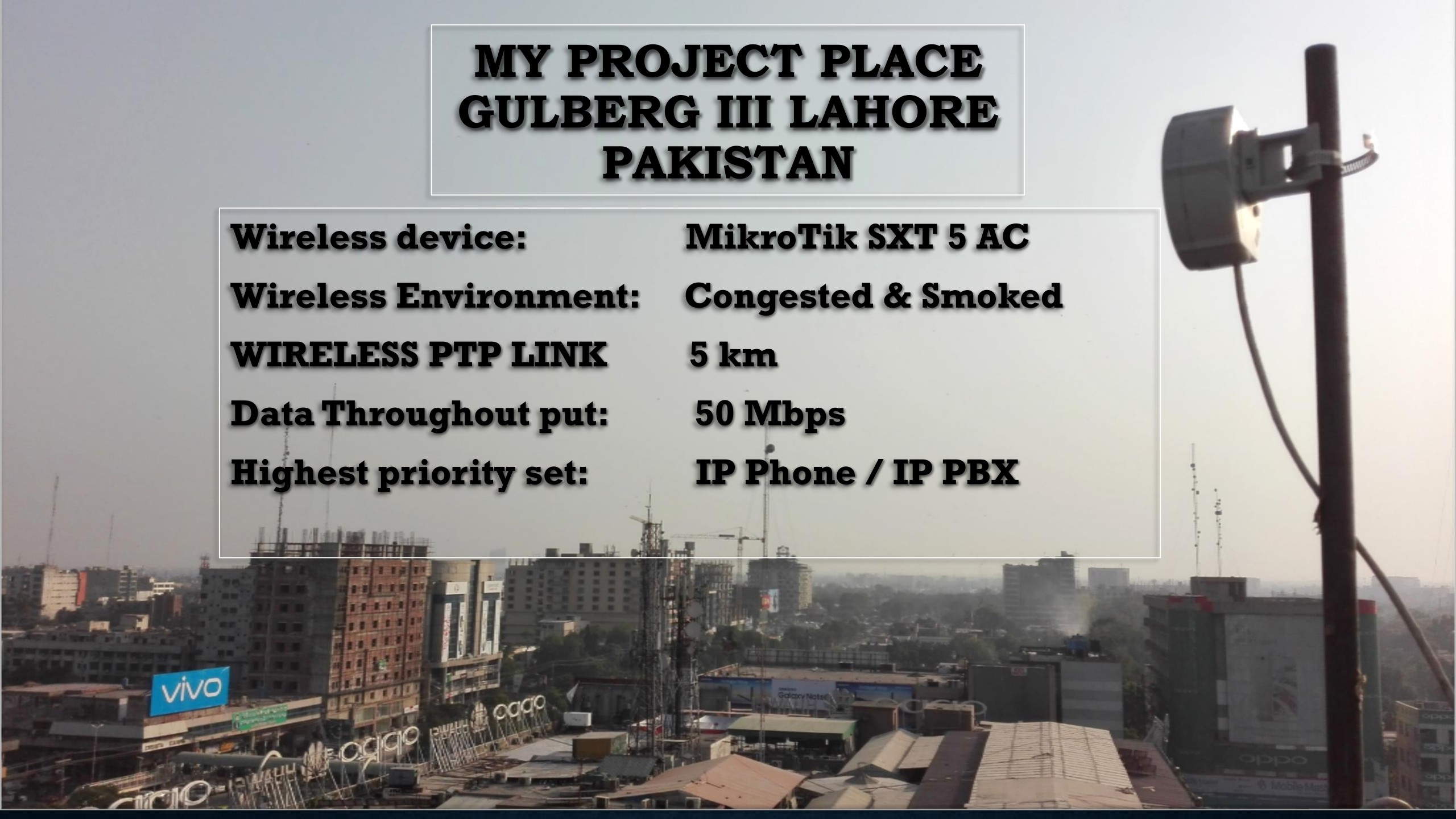
VOIP

FTP

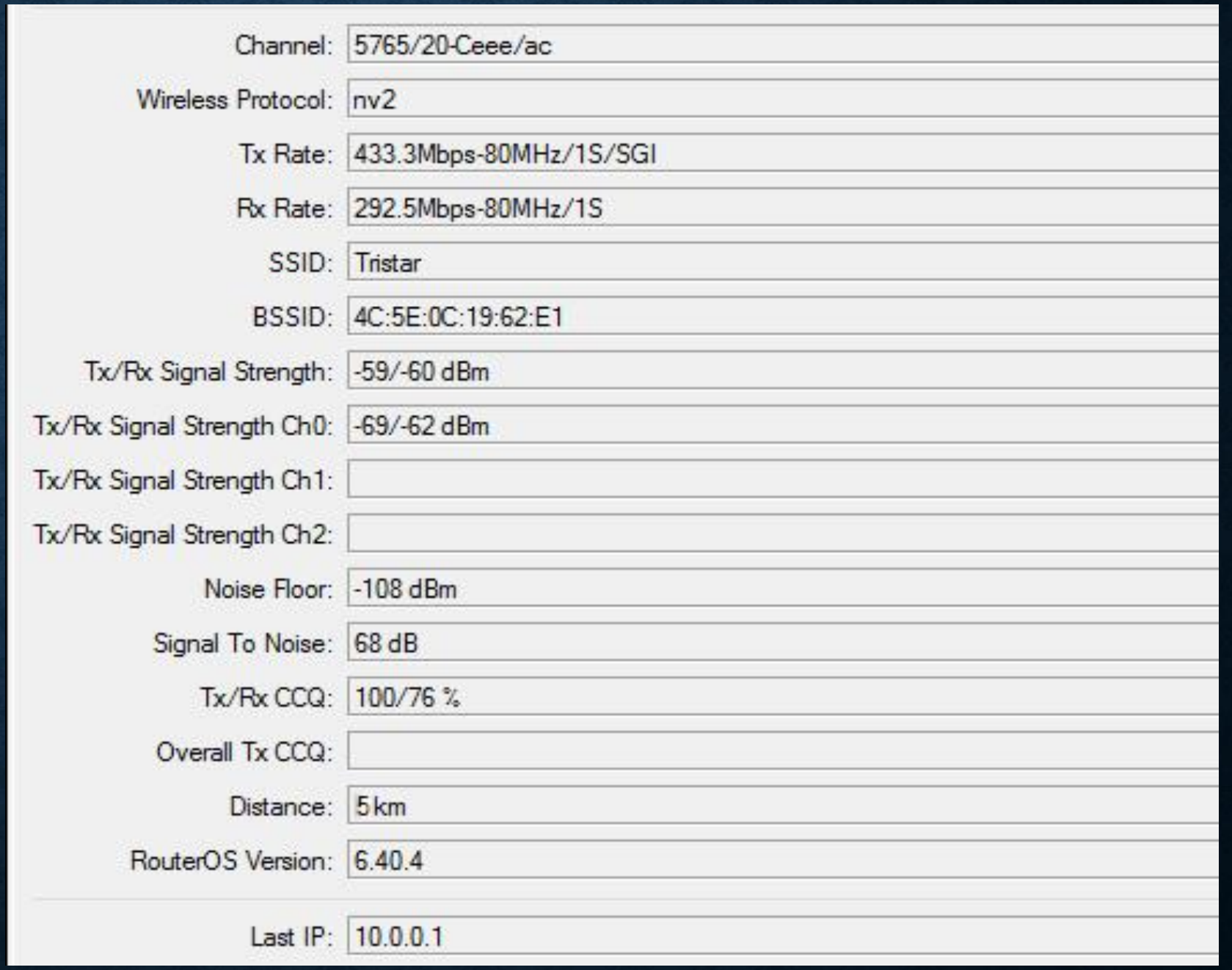
SQL base Software

MY PROJECT PLACE
GULBERG III LAHORE
PAKISTAN

Wireless device:	**MikroTik SXT 5 AC**
Wireless Environment:	**Congested & Smoked**
WIRELESS PTP LINK	**5 km**
Data Throughout put:	**50 Mbps**
Highest priority set:	**IP Phone / IP PBX**

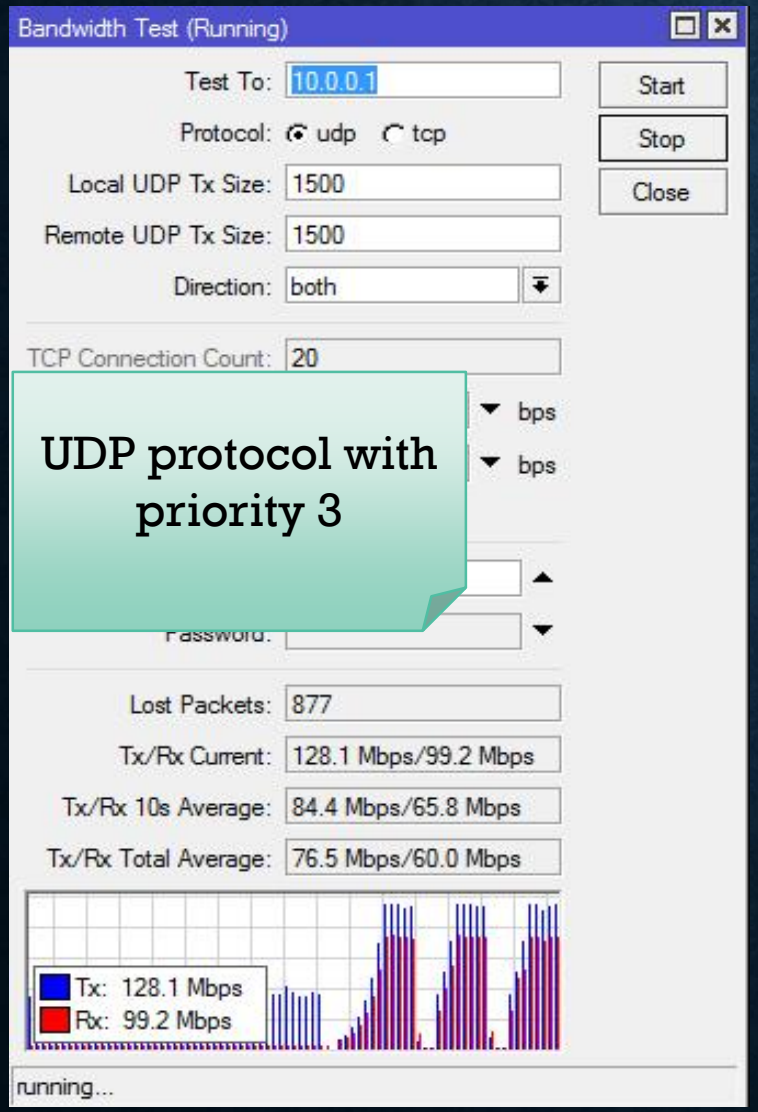


BRIDGE & BRIDGE STATION LINK STABILITY

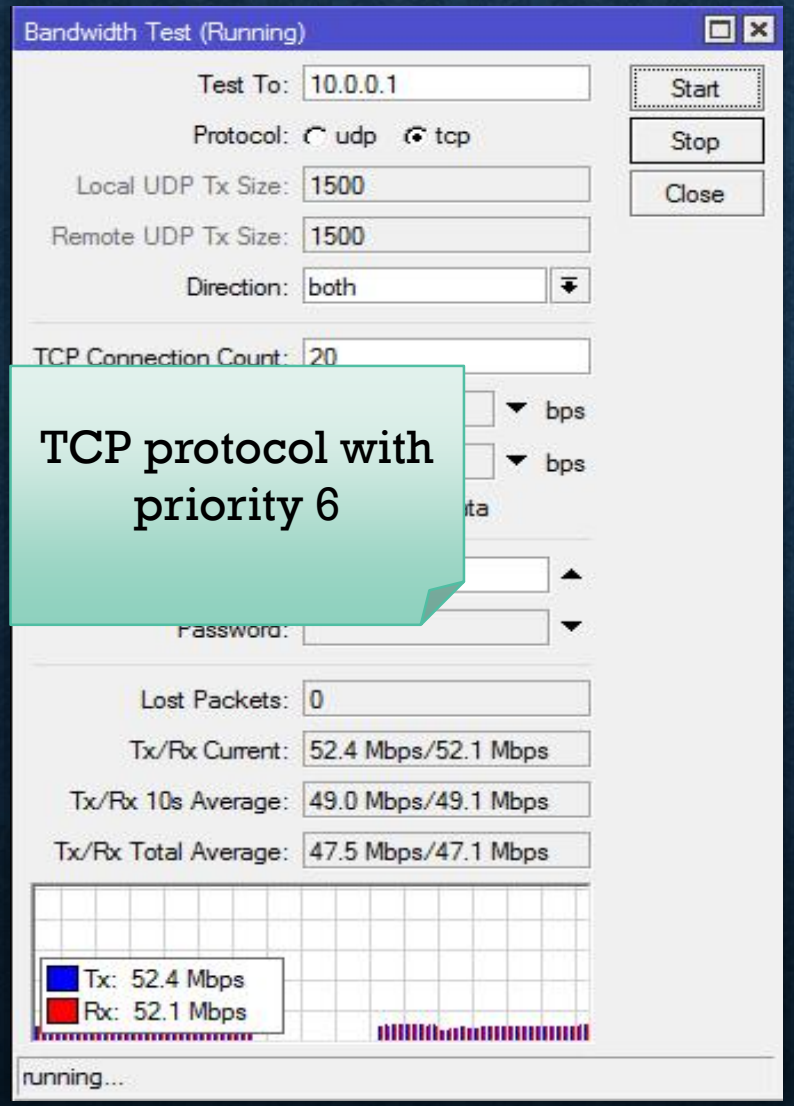


Channel:	5765/20-Ceee/ac
Wireless Protocol:	nv2
Tx Rate:	433.3Mbps-80MHz/1S/SGI
Rx Rate:	292.5Mbps-80MHz/1S
SSID:	Tristar
BSSID:	4C:5E:0C:19:62:E1
Tx/Rx Signal Strength:	-59/-60 dBm
Tx/Rx Signal Strength Ch0:	-69/-62 dBm
Tx/Rx Signal Strength Ch1:	
Tx/Rx Signal Strength Ch2:	
Noise Floor:	-108 dBm
Signal To Noise:	68 dB
Tx/Rx CCQ:	100/76 %
Overall Tx CCQ:	
Distance:	5 km
RouterOS Version:	6.40.4
Last IP:	10.0.0.1

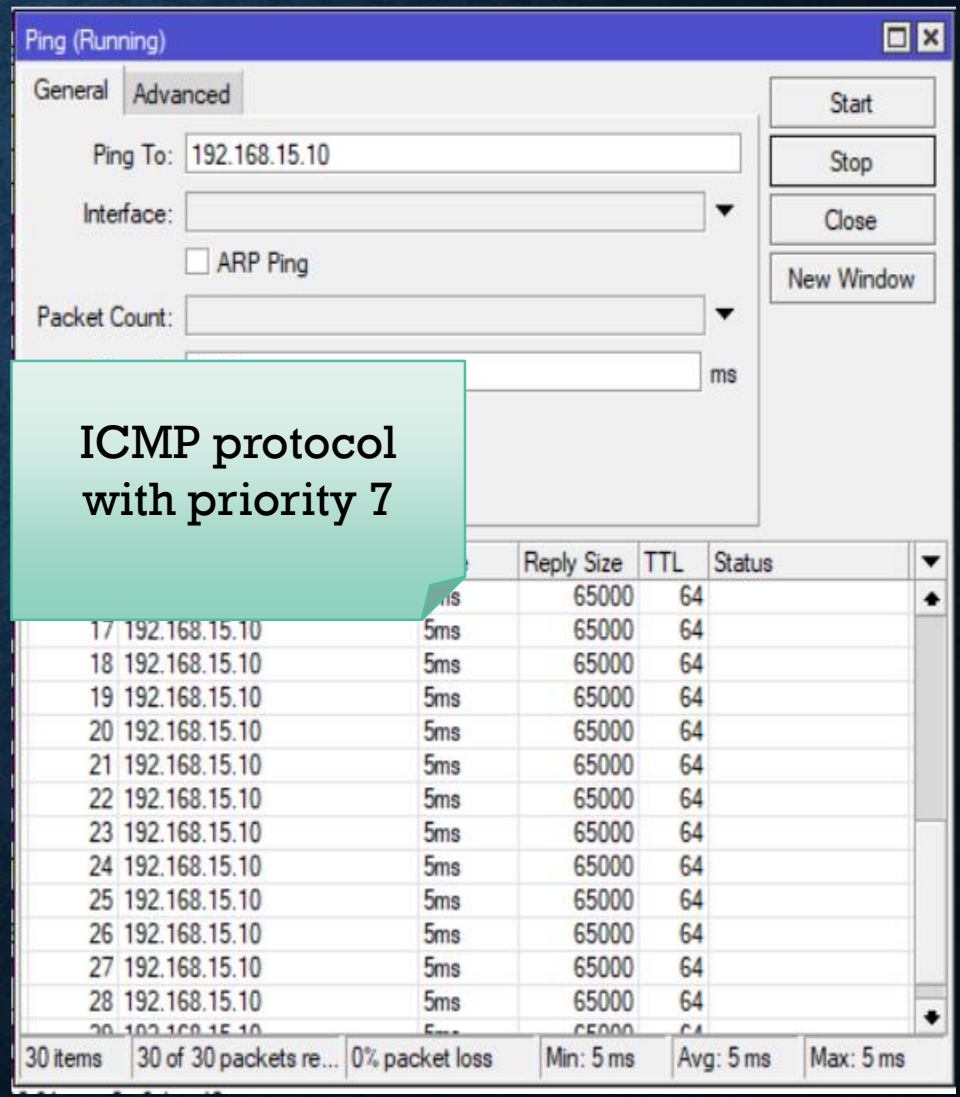
GOAL ACHIEVED



UDP protocol with priority 3



TCP protocol with priority 6

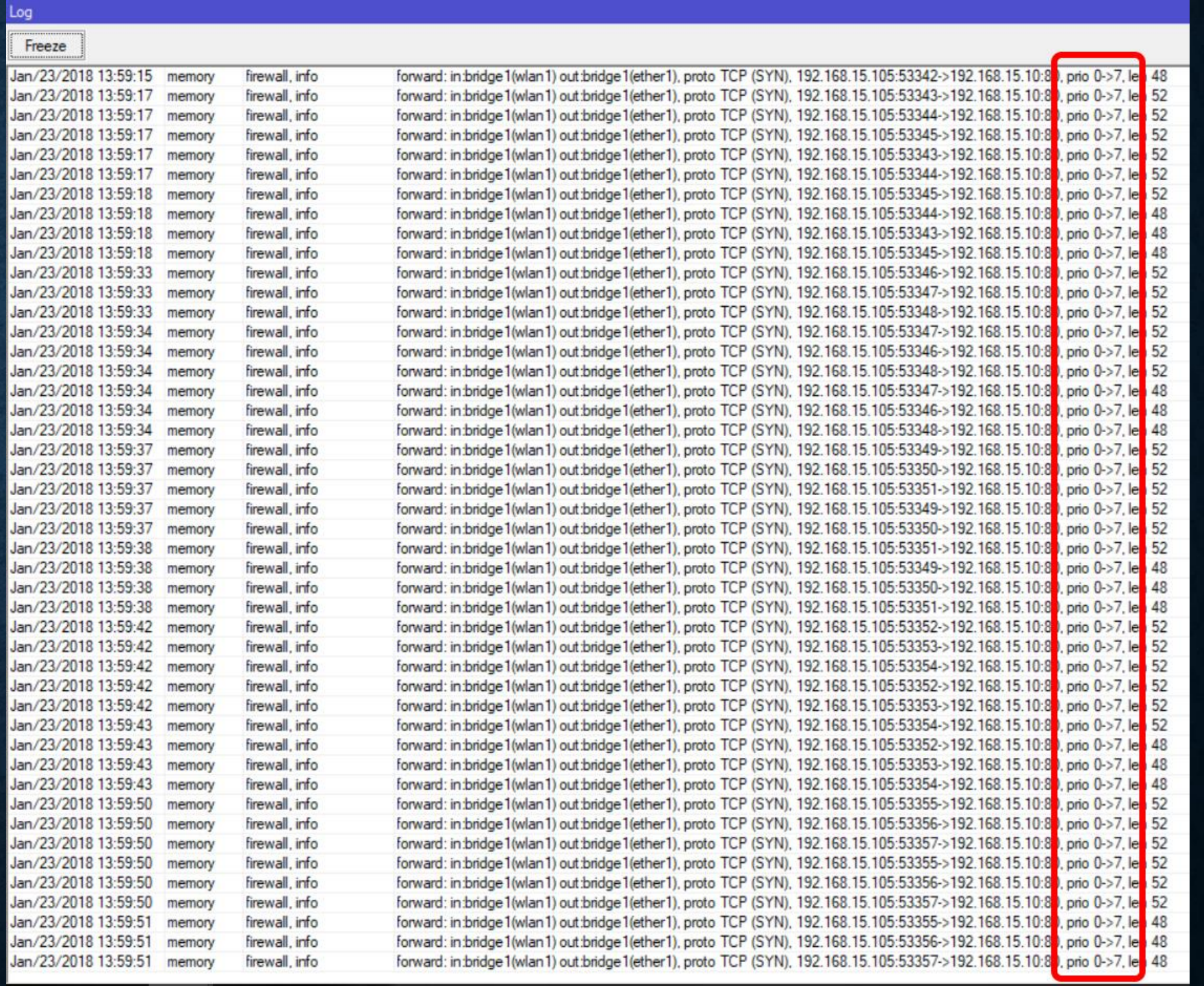


ICMP protocol with priority 7

NV2 QUEUES WITH HIGHEST FRAME PRIORITY (7)

(IP PHONE)

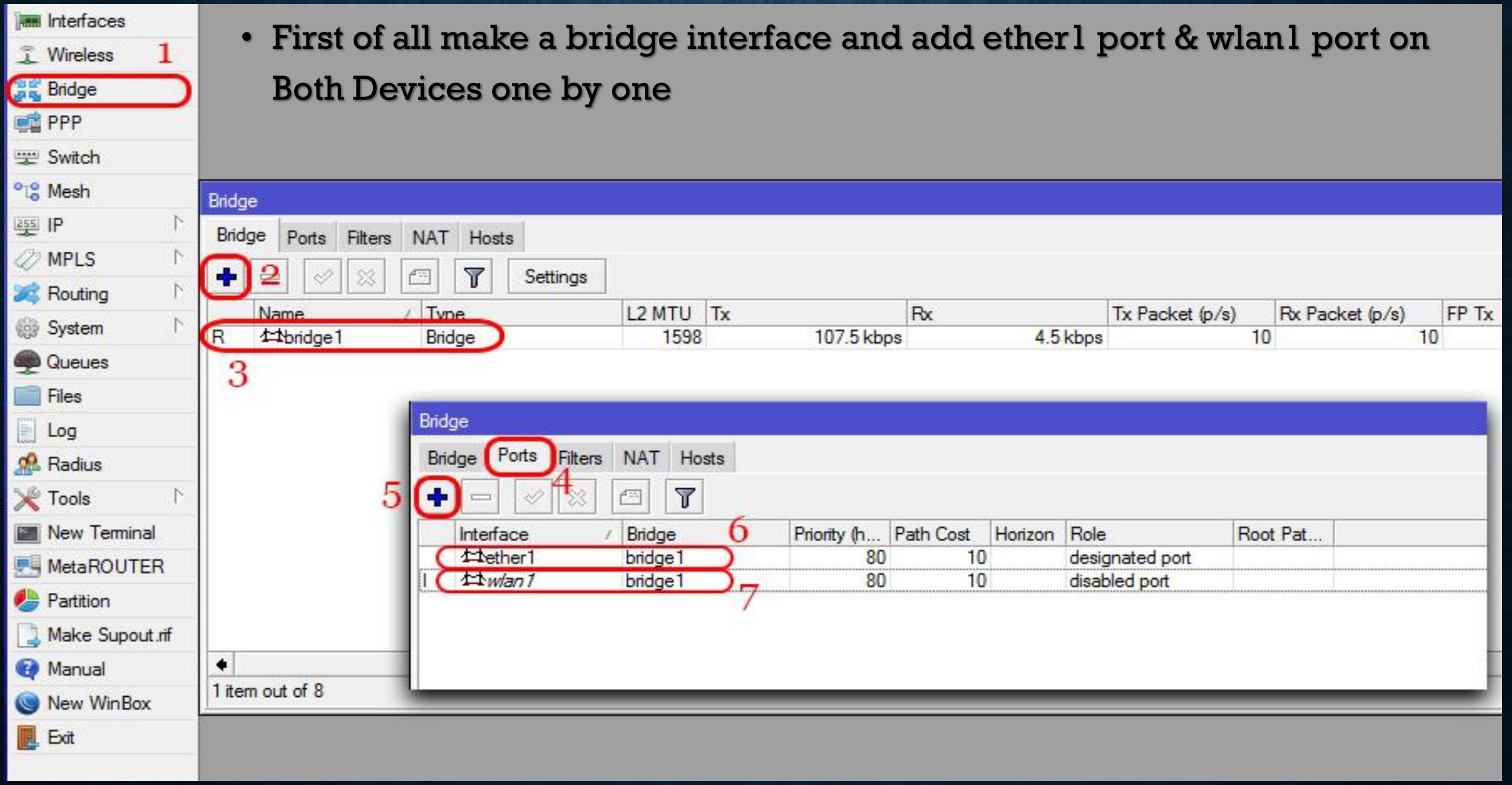
TCP LOGS



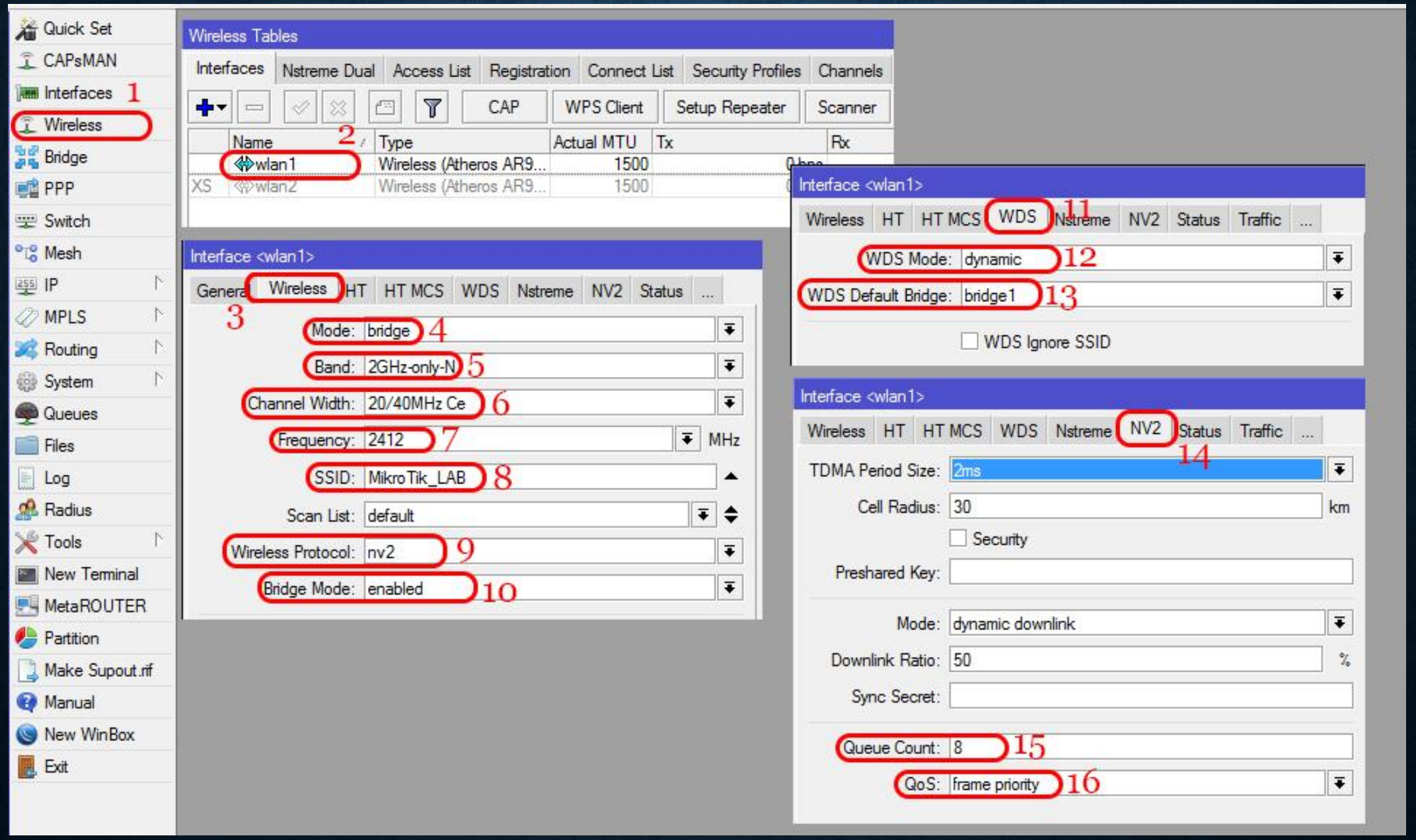
MIKROTIK OS WIRELESS BRIDGE CONFIGURATION

BRIDGE CONFIGURATION

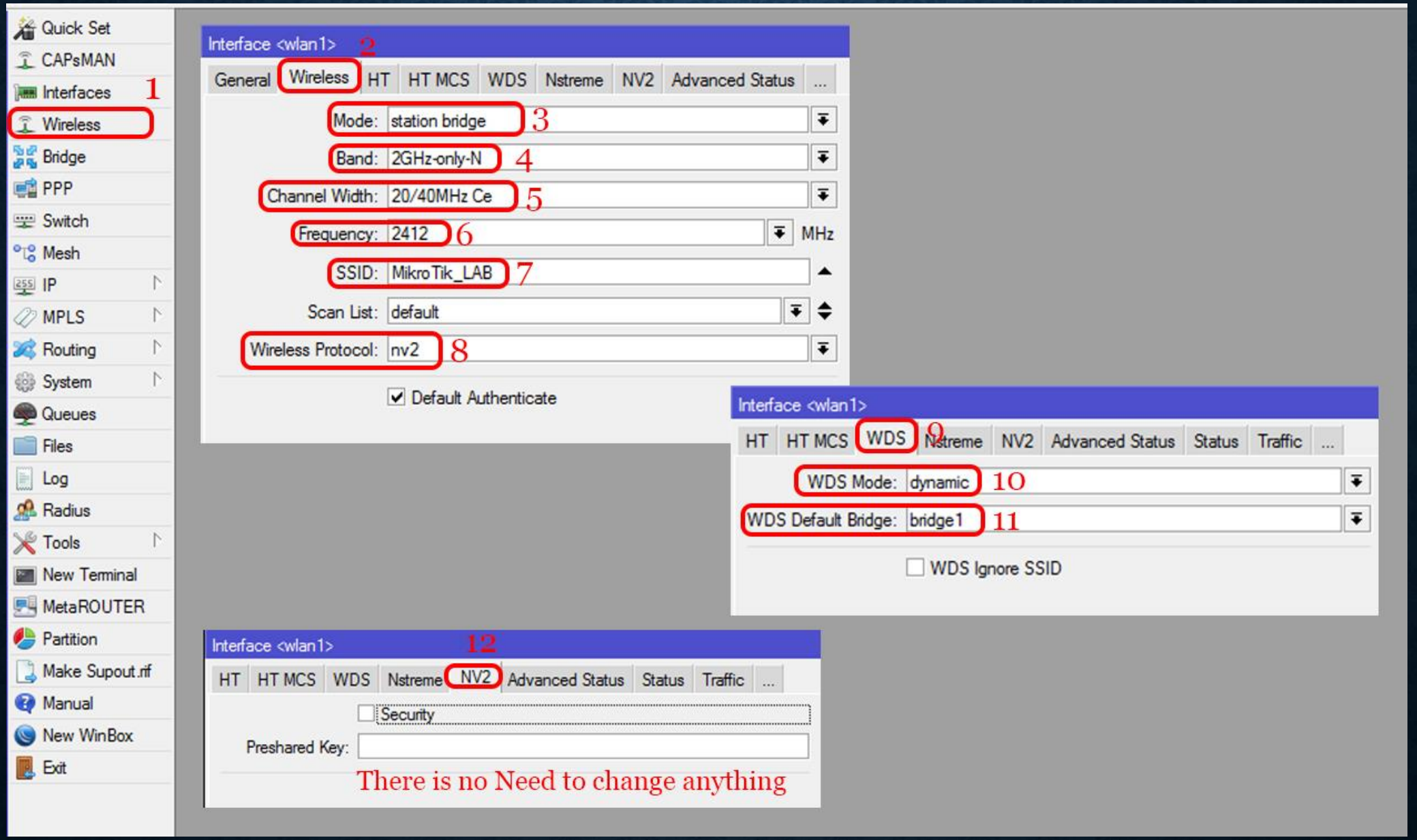
- First of all make a bridge interface and add ether1 port & wlan1 port on Both Devices one by one



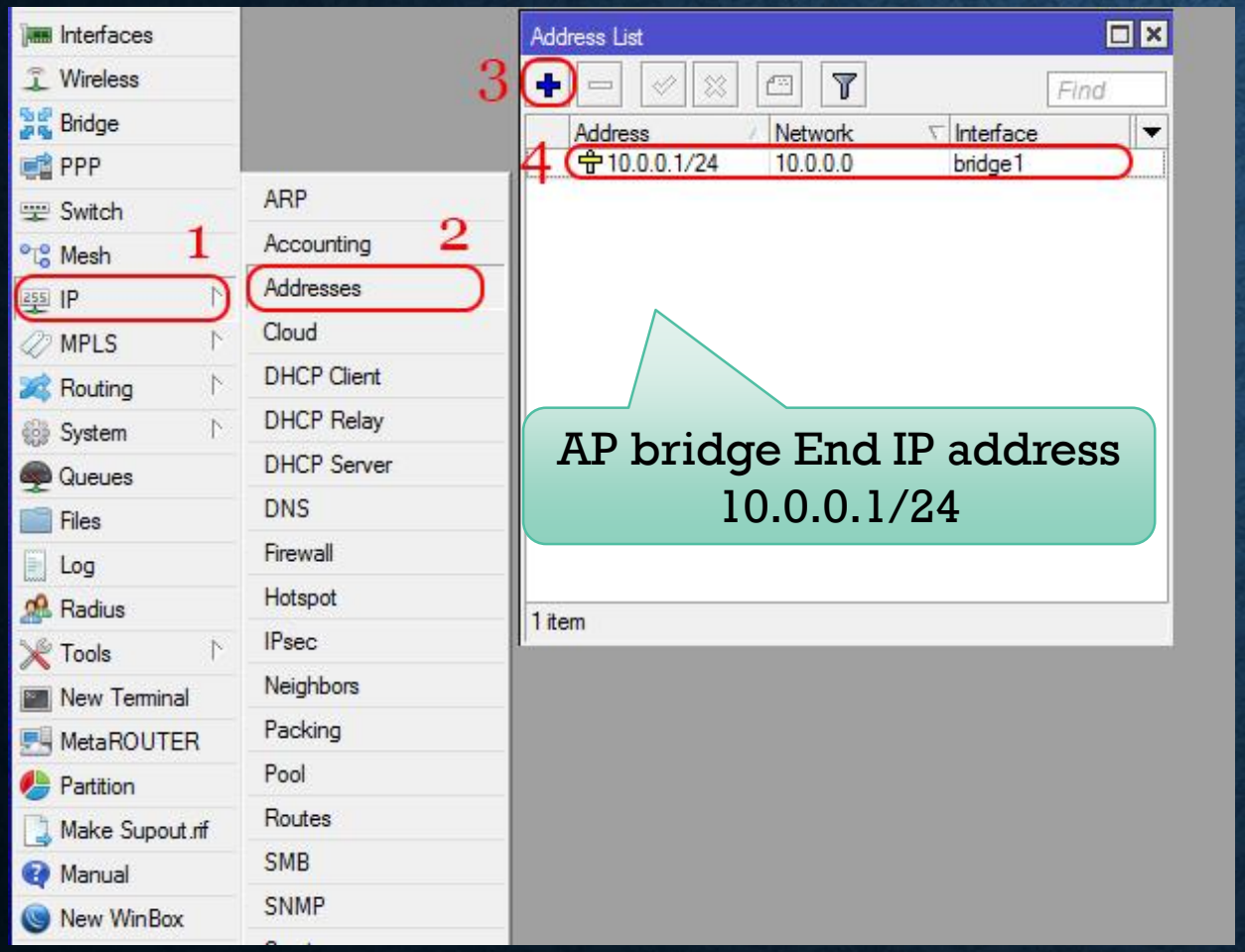
AP BRIDGE END CONFIGURATION

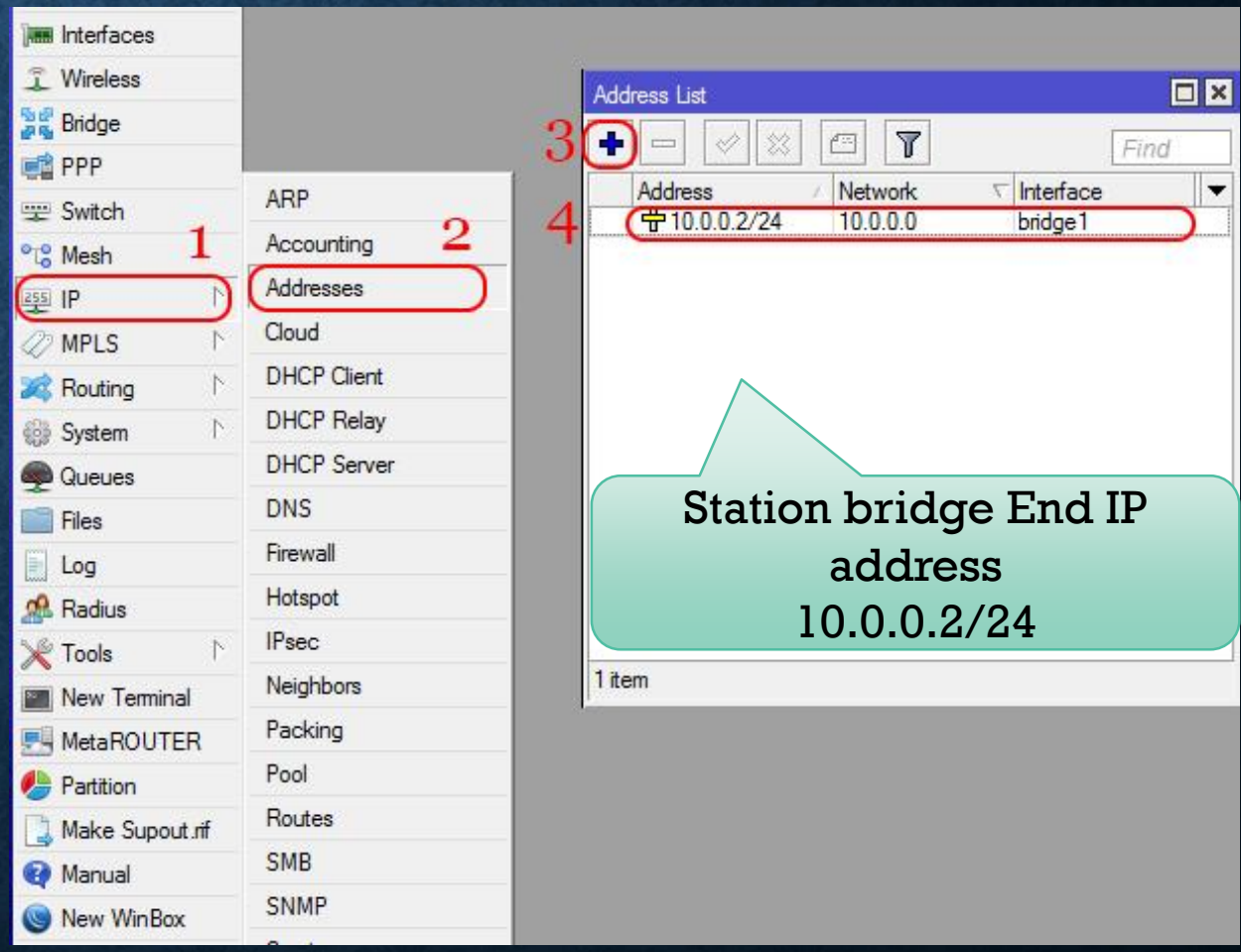


STATION BRIDGE END CONFIGURATION



IP ADDRESS TO BRIDGE INTERFACES



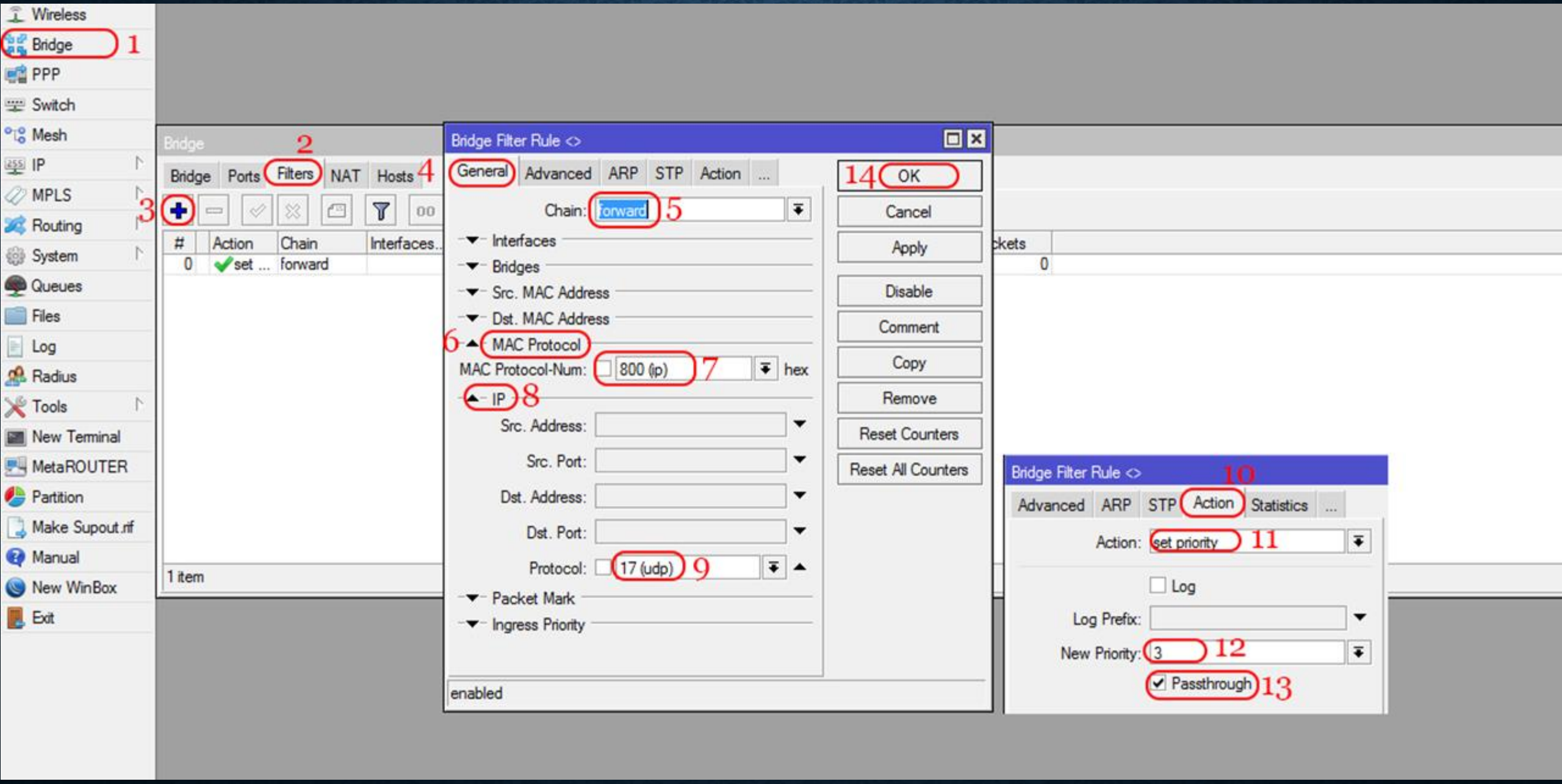


METHOD 1

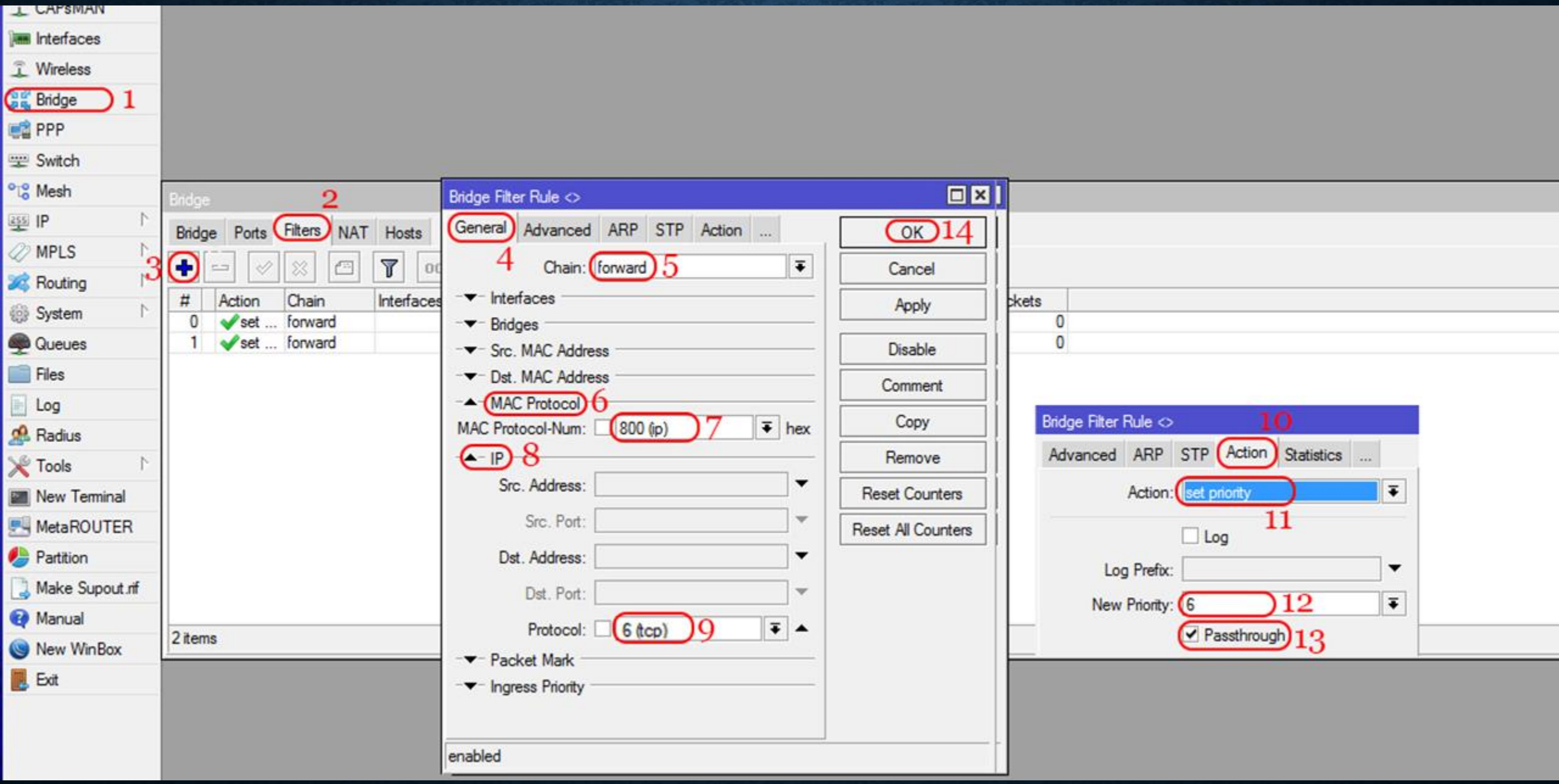
FRAME PRIORITY WITH LAYER 2.

IN BRIDGE FILTERS

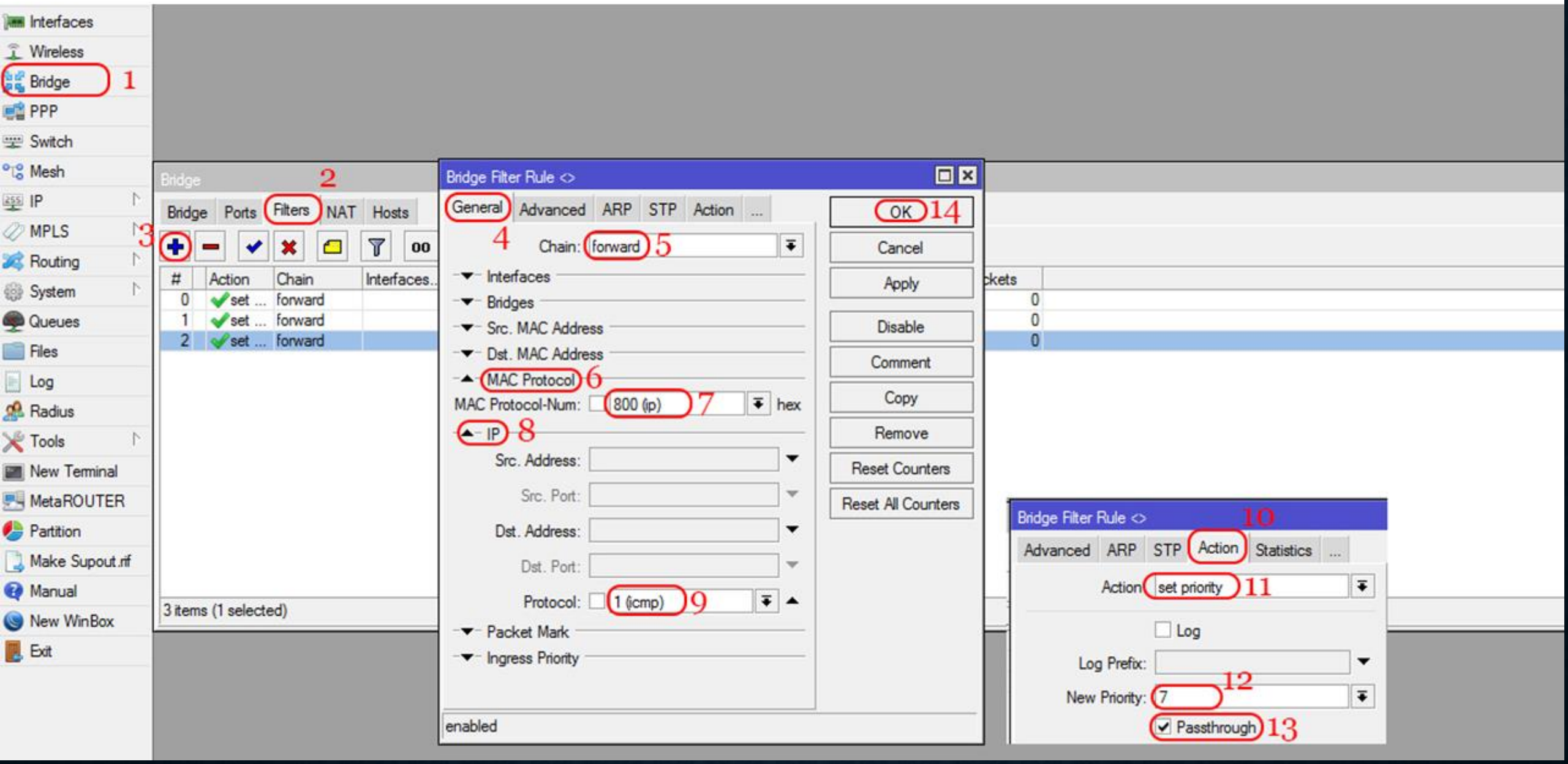
UDP FRAME PRIORITY



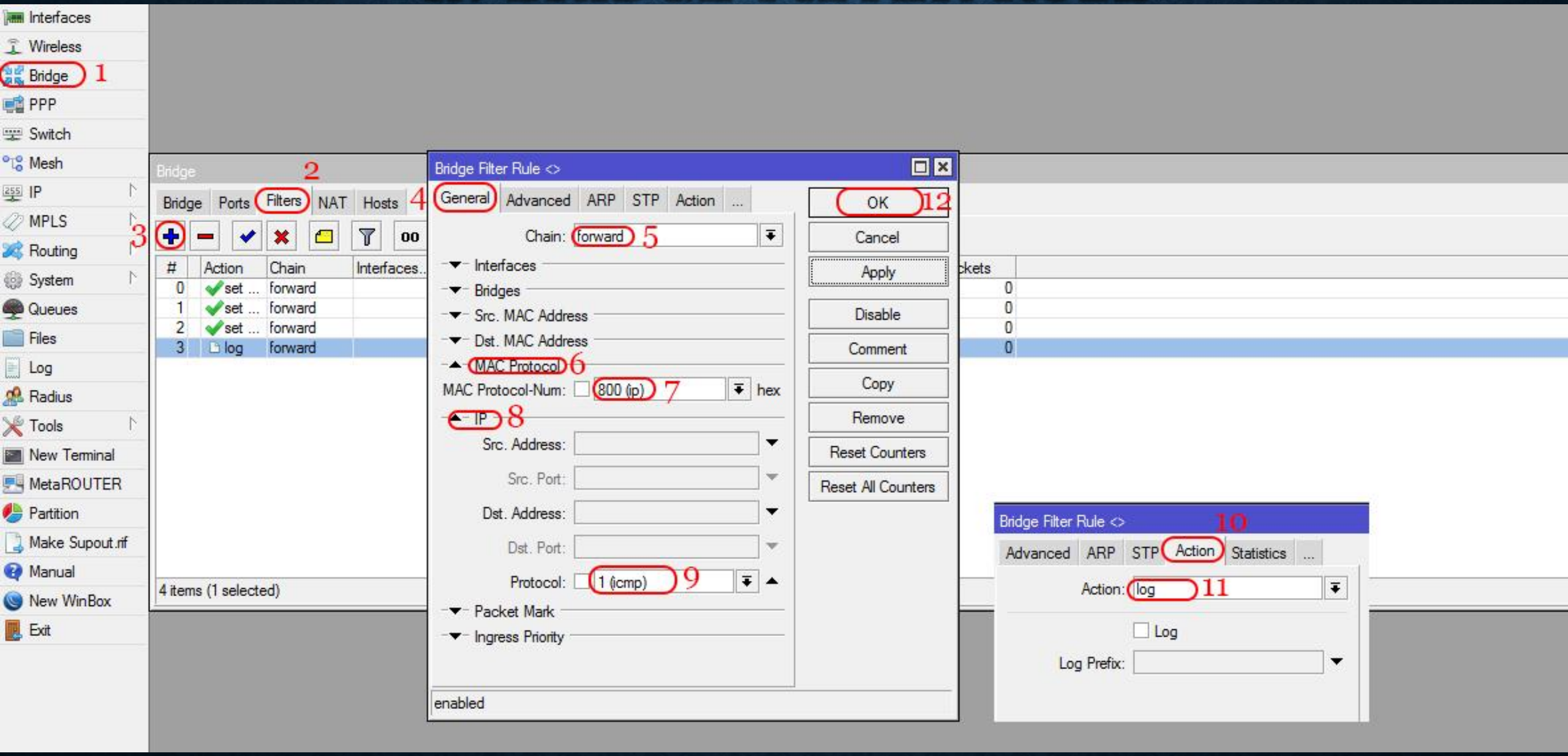
TCP FRAME PRIORITY



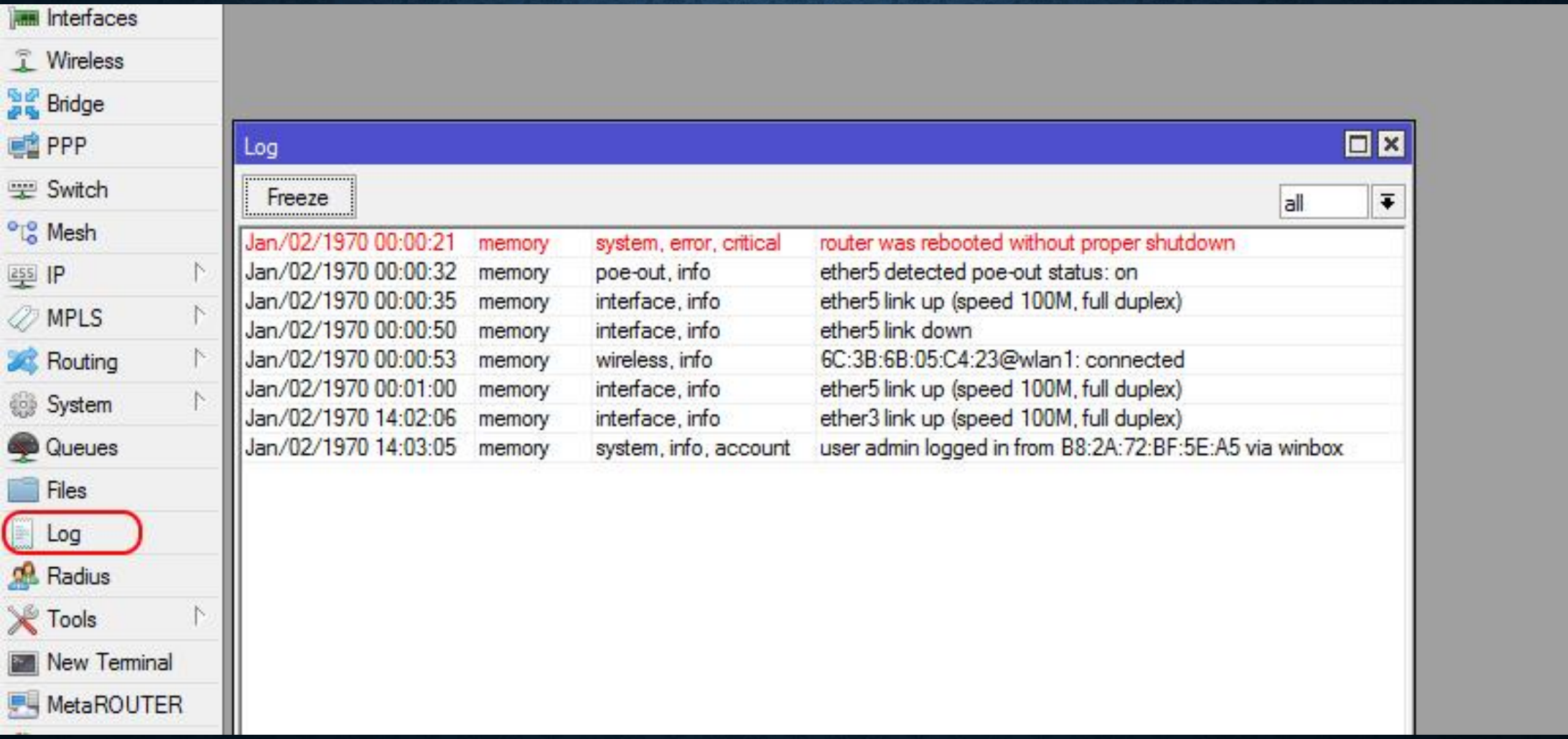
ICMP (PING) FRAME PRIORITY



LOG SETTING TO CONFIRM ICMP PRIORITY IN BRIDGE FILTER RULE



LOGS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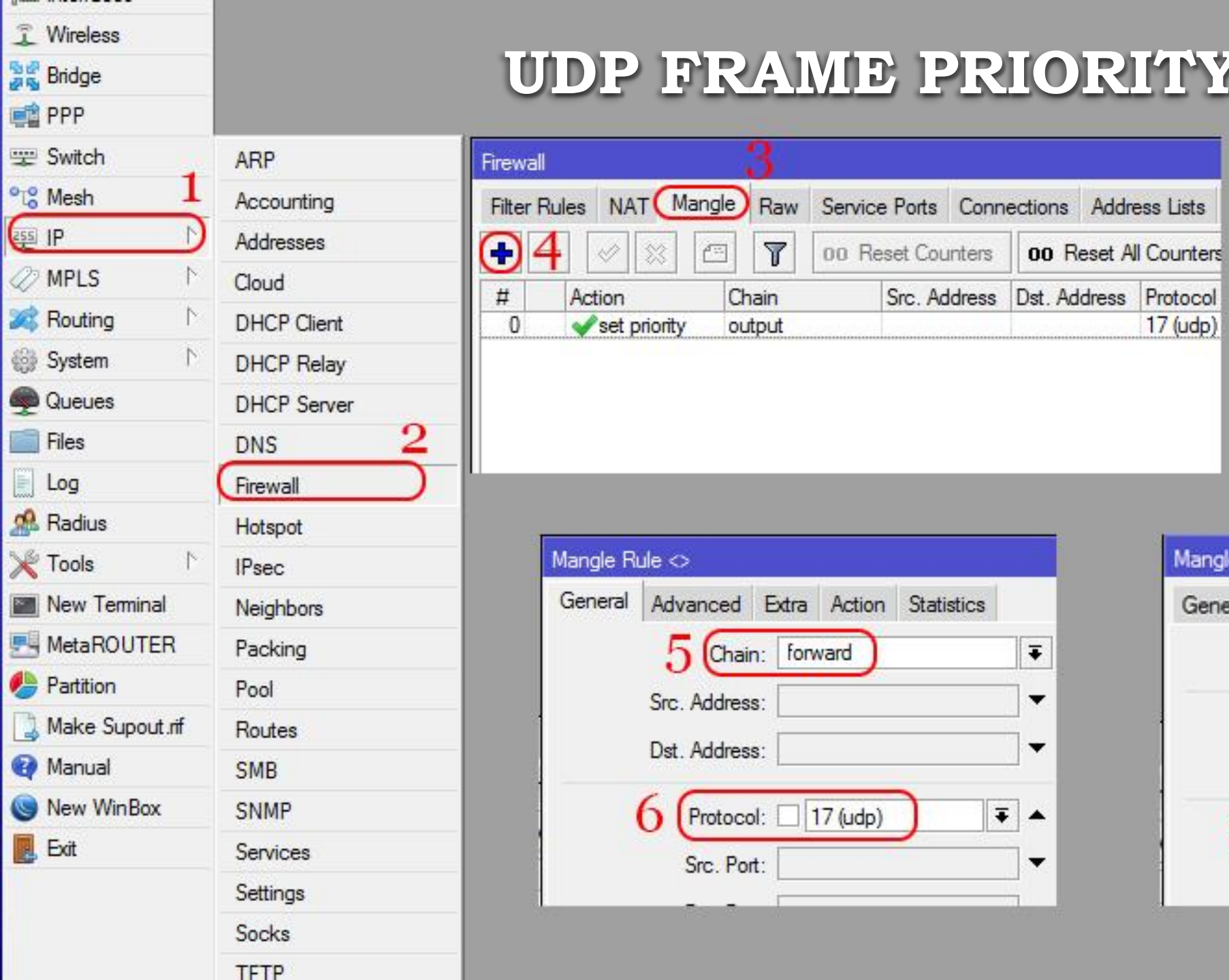
Jan/02/1970 00:00:21 memory system, error, critical router was rebooted without proper shutdown
Jan/02/1970 00:00:32 memory poe-out, info ether5 detected poe-out status: on
Jan/02/1970 00:00:35 memory interface, info ether5 link up (speed 100M, full duplex)
Jan/02/1970 00:00:50 memory interface, info ether5 link down
Jan/02/1970 00:00:53 memory wireless, info 6C:3B:6B:05:C4:23@wlan1: connected
Jan/02/1970 00:01:00 memory interface, info ether5 link up (speed 100M, full duplex)
Jan/02/1970 14:02:06 memory interface, info ether3 link up (speed 100M, full duplex)
Jan/02/1970 14:03:05 memory system, info, account user admin logged in from B8:2A:72:BF:5E:A5 via winbox

METHOD 2

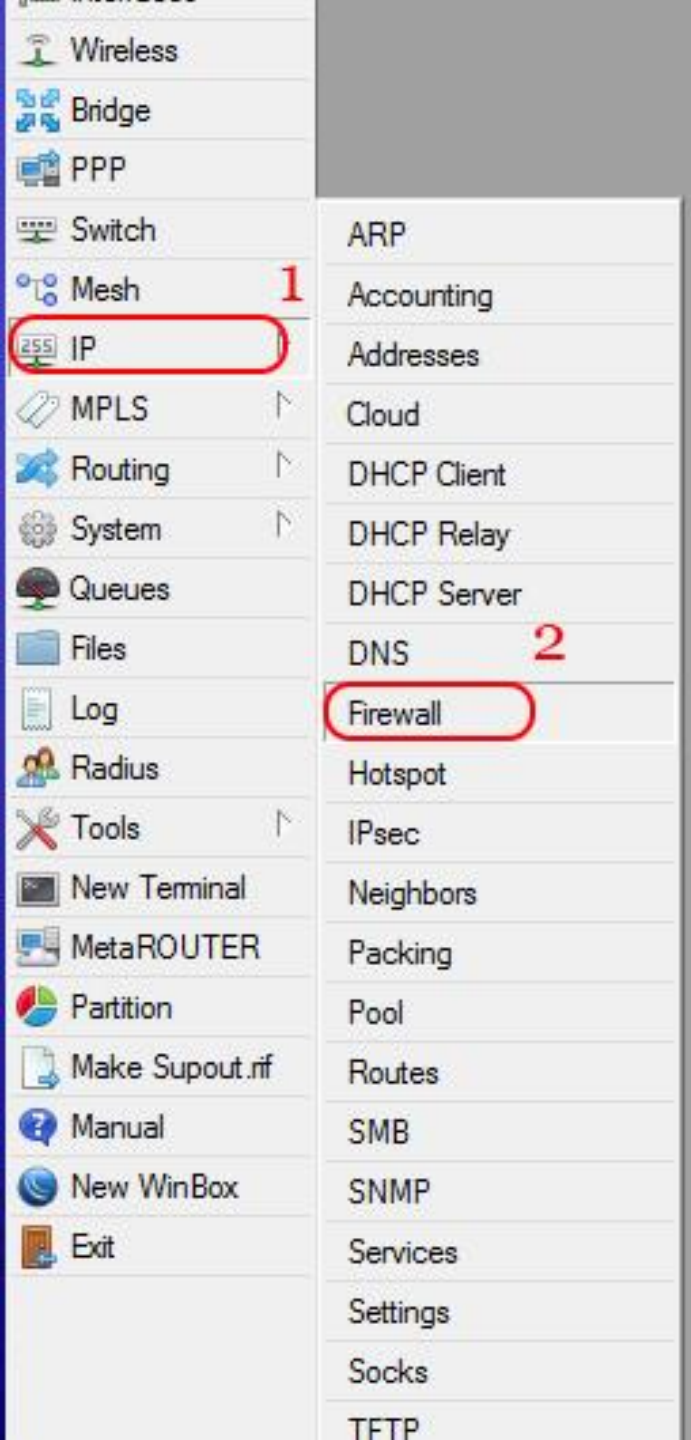
FRAME PRIORITY WITH LAYER 3

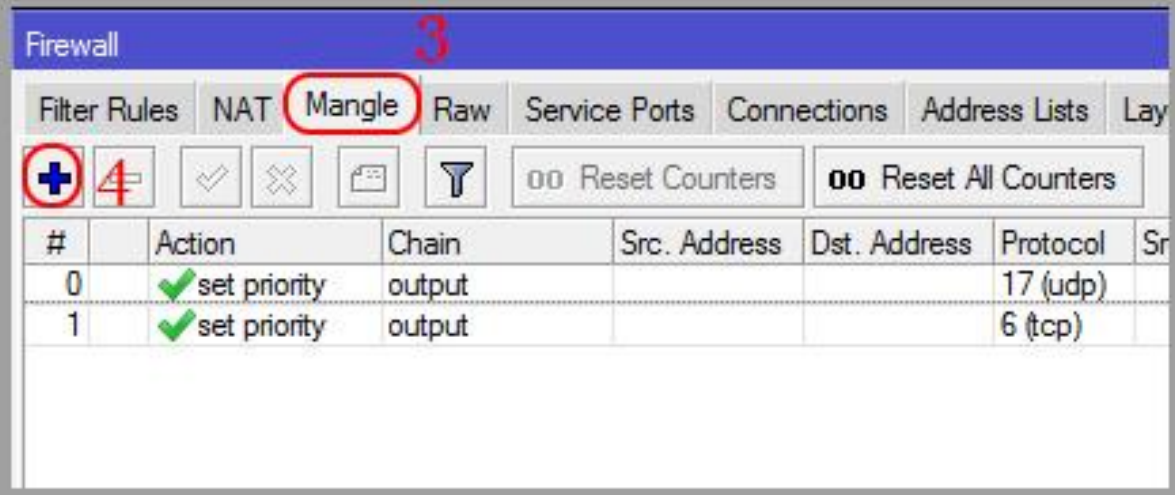
IN IP FIREWALL MANGLE

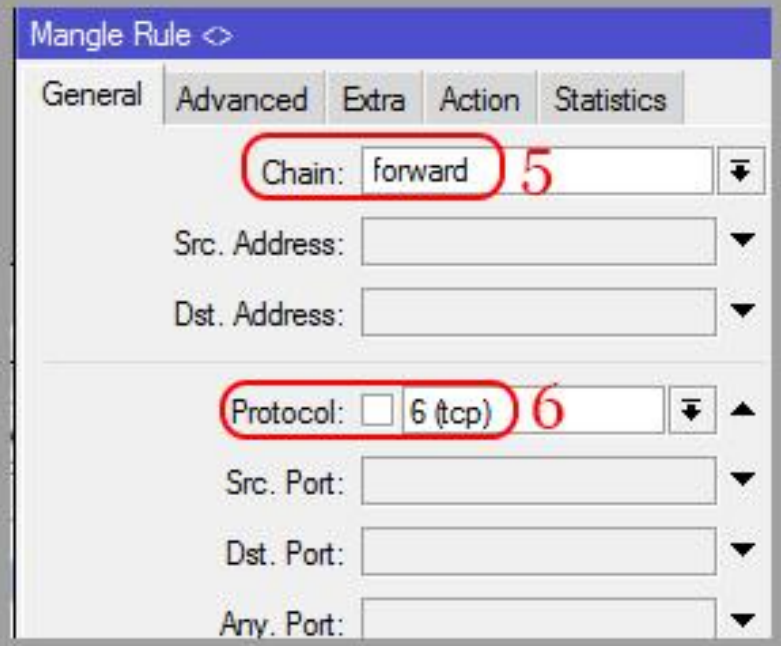
UDP FRAME PRIORITY

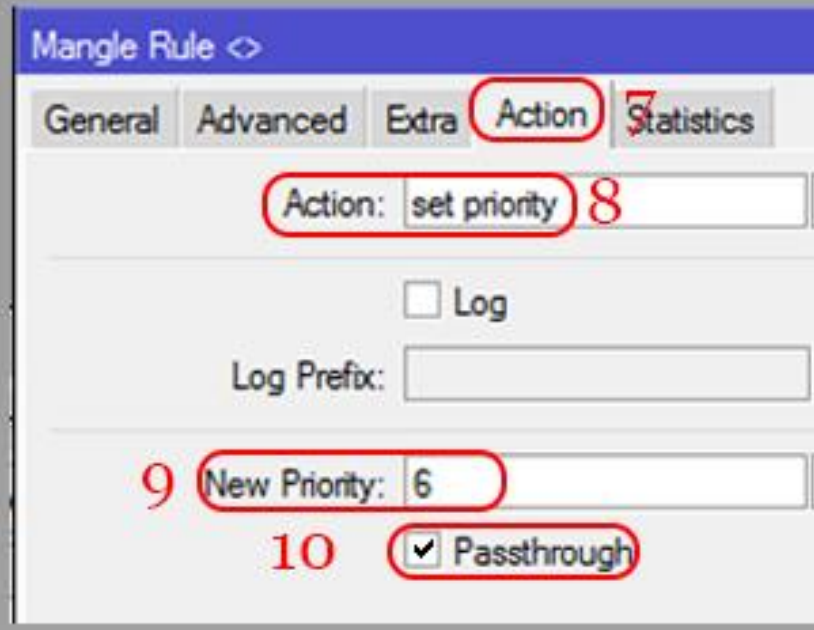


TCP FRAME PRIORITY









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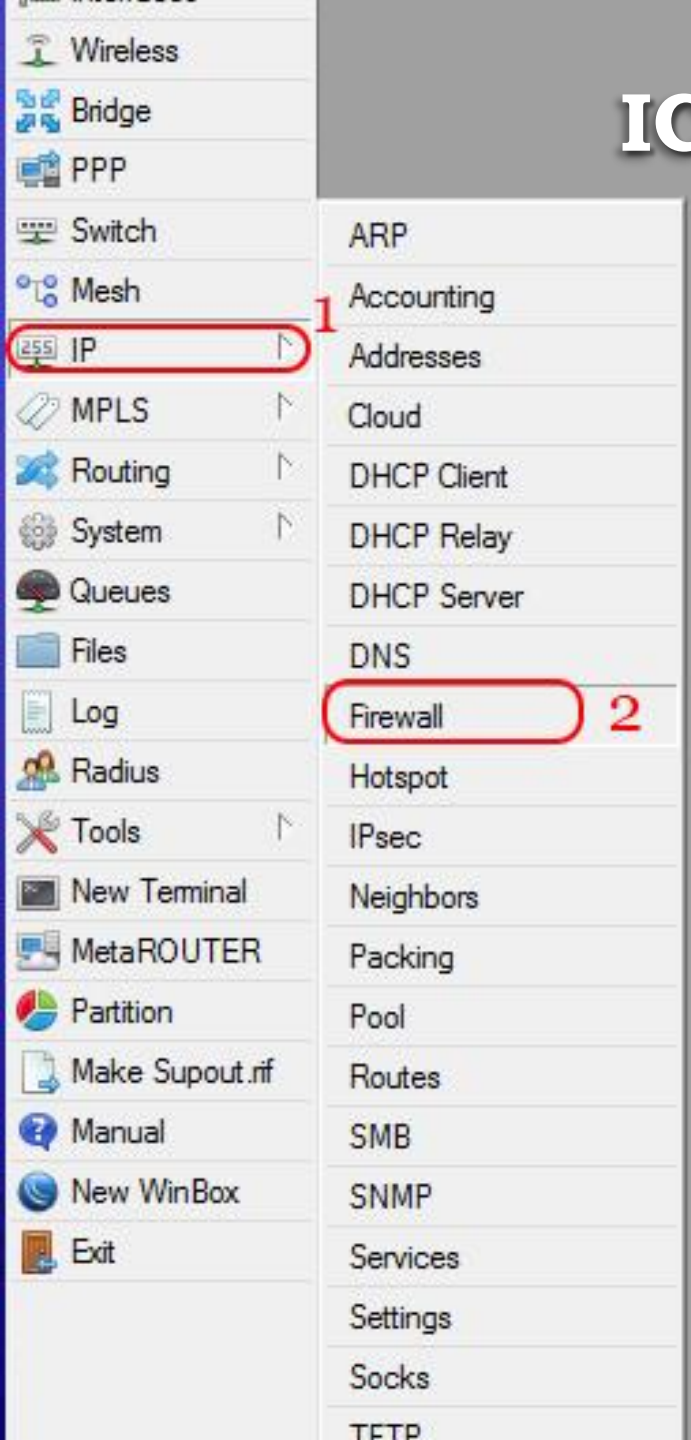
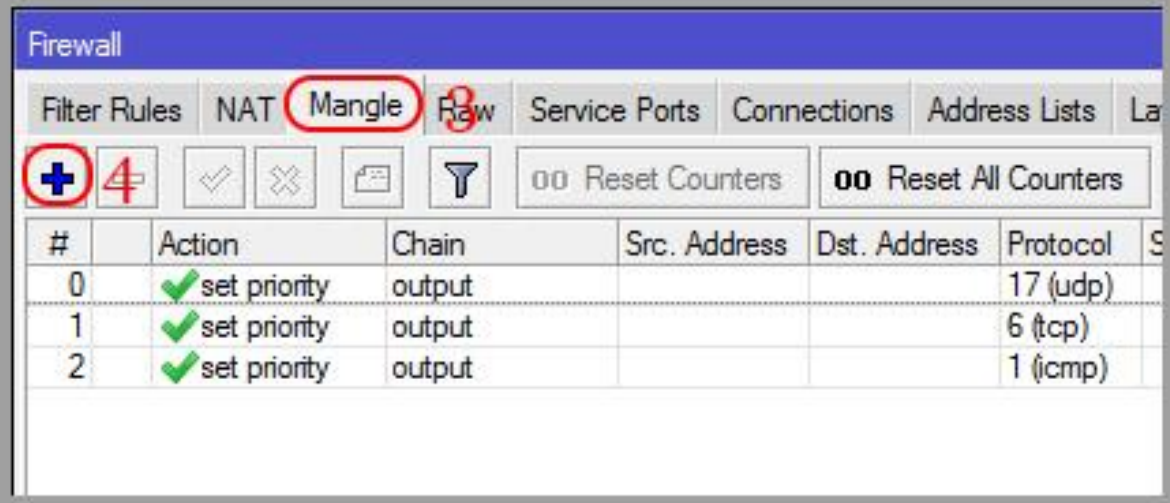
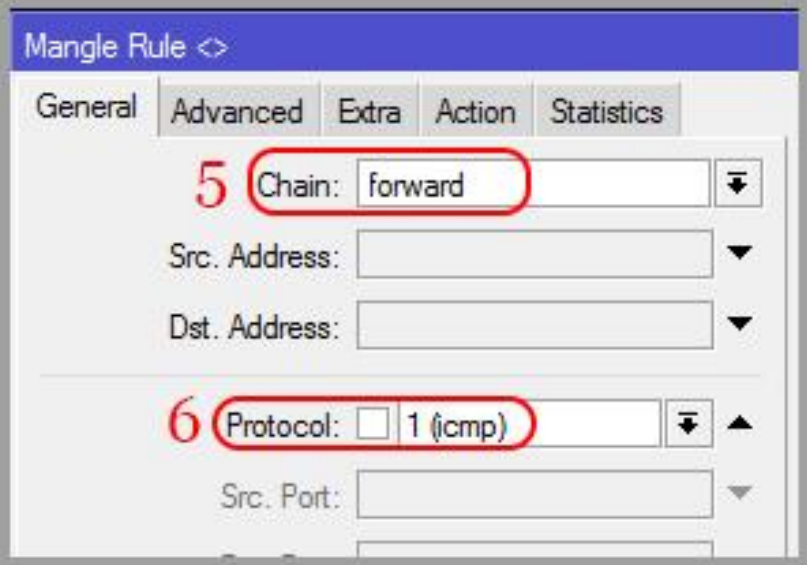
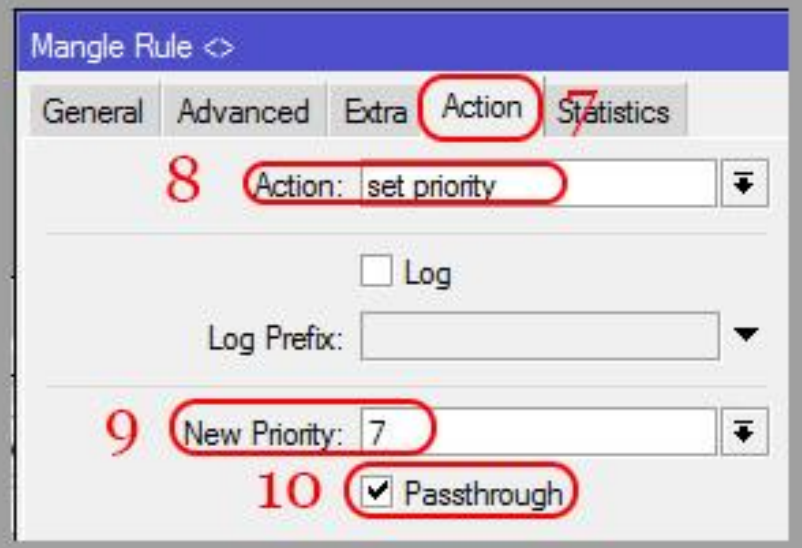
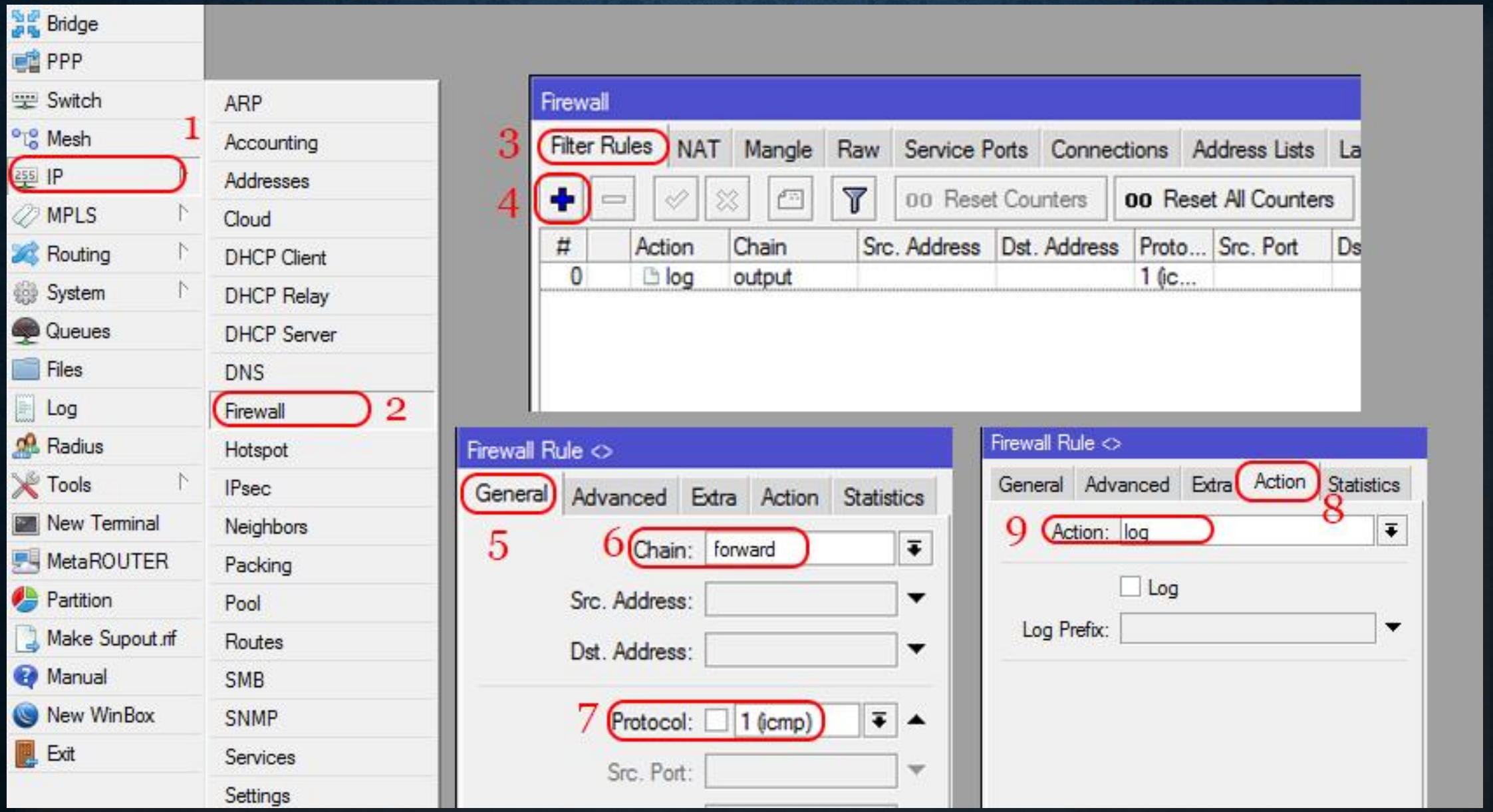




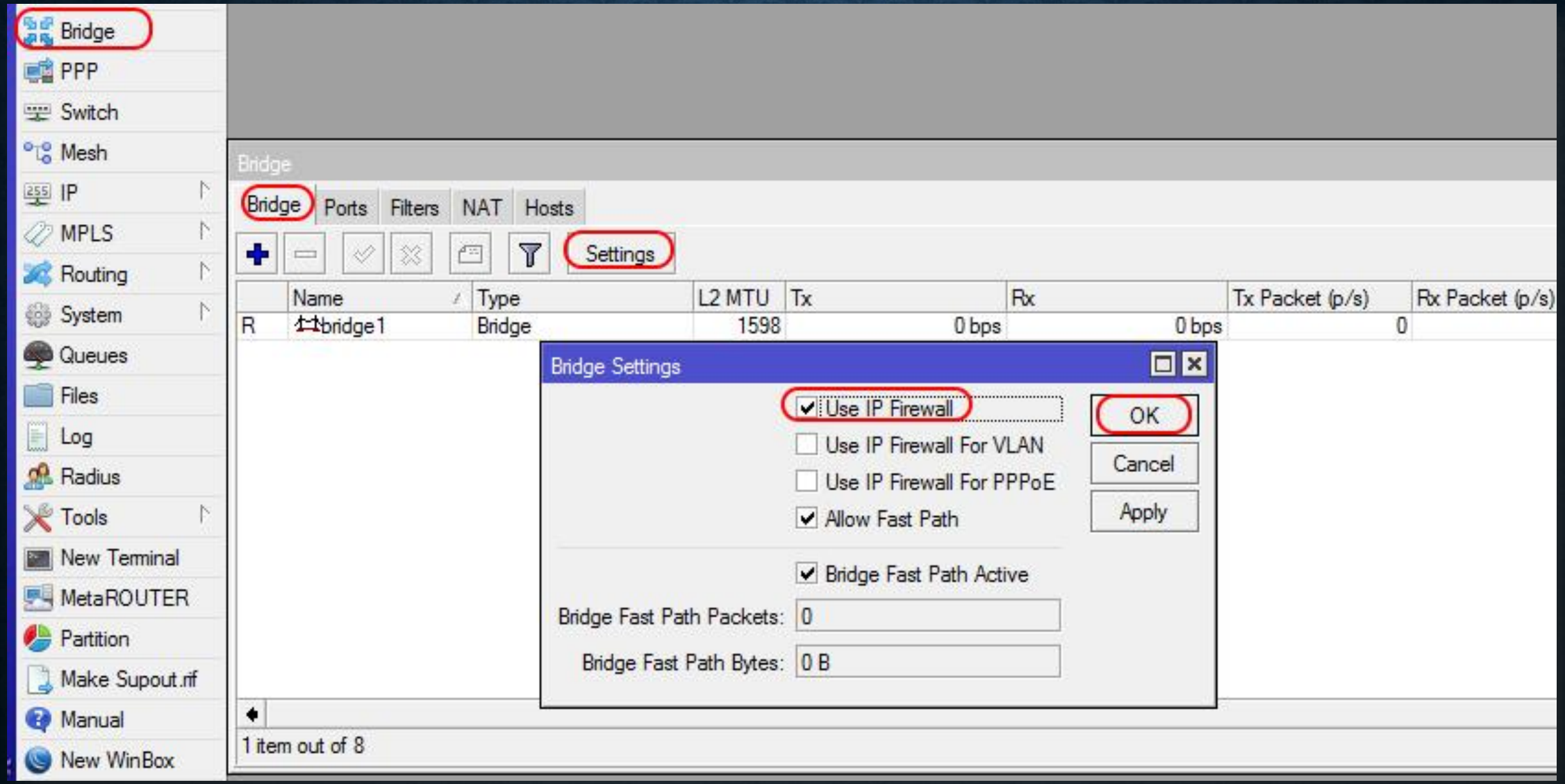




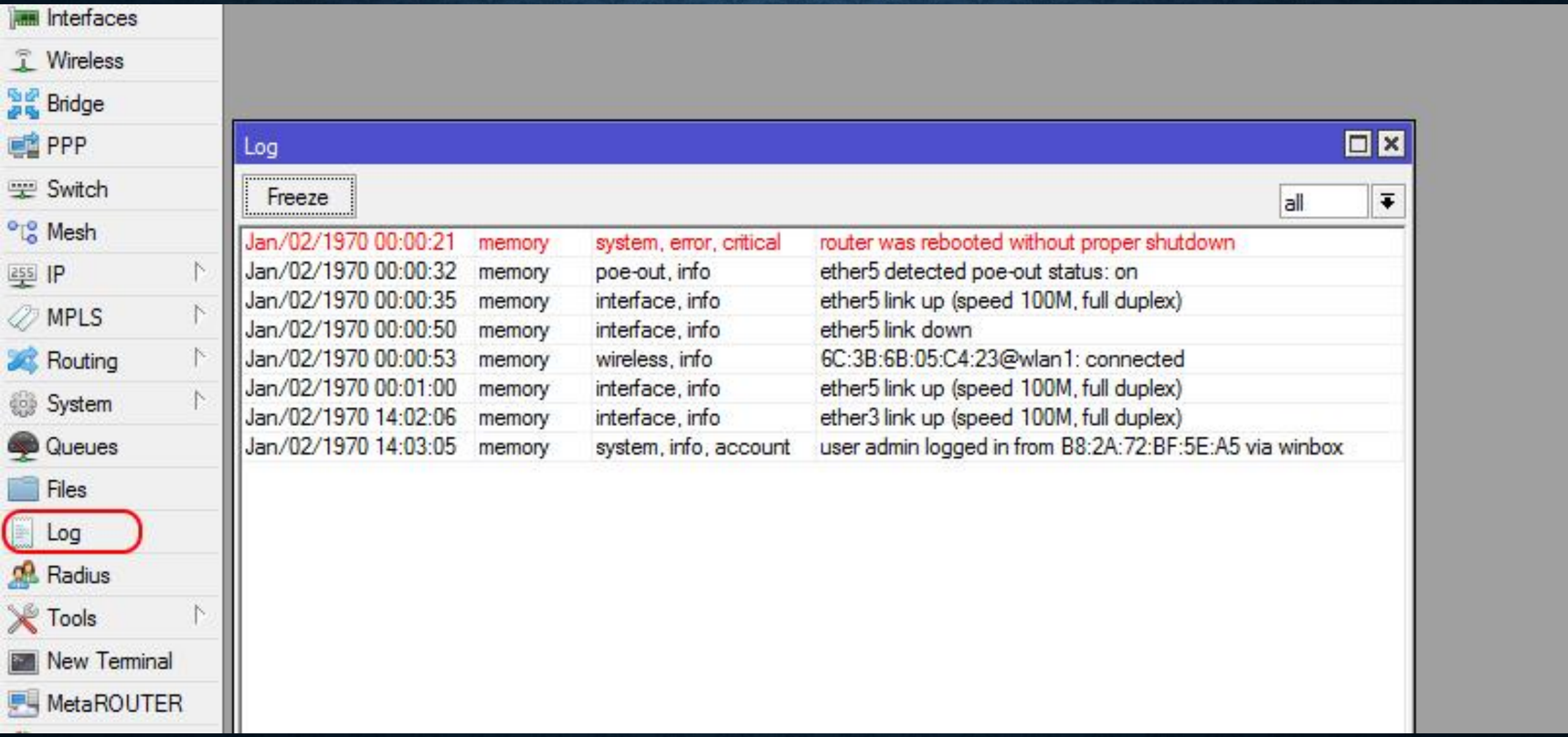
LOG SETTING TO CONFIRM ICMP PRIORITY
IP FIREWALL FILTER



USE OF FIREWALL IN BRIDGE



LOGS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CONCLUSION

MikroTik OS Base Wireless Bridge is more reliable, Stronger & Faster than all existing Wireless PTP Bridge Link in Congested Environment **as I`ve Tested**

THANK YOU

ANY QUESTION PLEASE