
MUM
EUROPE
2017

MIKROTIK TRAFFIC GENERATOR STUDY CASE

17 years experience at IT industry, Mikrotik Certified Consultant and Trainer: MTCNA, MTCRE, MTCTCE, MTCUME, MTCWE, MTCIPv6E, MTCINE, CISA, CISSP, Master ITIL.

- (2016 – Now) CEO @ FiberCLI
- (2015 – Now) CTO WISP
- (2008 – Now) Security Consultant and Analyst
- (2000 – 2007) Networking, Security and ITIL Teacher

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MADRID / PRAGUE

My previous presentations at MUM

- (2016 @ MUM Middle East) - System integration and analysis
- (2016 @ MUM Spain) - Integración de MikroTik con cabeceras de fibra óptica
- (2016 @ MUM Europe) - Securing and testing with MikroTik
- (2015 @ MUM Spain) - Pruebas de seguridad y configuración con Mikrotik

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MADRID / PRAGUE

COMPANY PROFILE

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WE ARE PURE FIBER

PROJECT BASED

- Fiber optic installation outdor and indoor (Hotel and Office Building)
- Wireless installation Rural area and City

business inquirieS : hello@fibercli.com

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WE ARE PURE FIBER

CONSULTANT

- Mikrotik Products
- Licensed Antennas
- Ipv4 Brocker
- Advanced monitoring integrations

business inquirieS : hello@fibercli.com

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TRAINING

- Official Mikrotik Training Partner with three different languages and modules (English, Indonesia and Spanish)
- Courses on premises of companies in Europe and middle east
- Specialized in IPv6

business inquirieS : hello@fibercli.com

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AGENDA

- Traffic Generator Introduction
- Special Use Case
- Example

Objetive

The goal of this presentation is to explain the operation of the traffic generator

Problem

What to do when I need to test or audit whether a router or a system is working correctly?

Symptoms

We have a complex configuration and we have no idea how to test it.

Solution

Traffic generator

TRAFFIC GENERATOR INTRODUCTION

WHAT IS TRAFFIC GENERATOR?

“Traffic Generator is a tool that allows to evaluate performance of DUT (Device Under Test) or SUT (System Under Test).”

https://wiki.mikrotik.com/wiki/Manual:Tools/Traffic_Generator

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WHAT'S TRAFFIC GENERATOR CAN DO?

“Traffic Generator tool can generate and send RAW packets over specific ports. It also collects latency and jitter values, tx/rx rates, counts lost packets and detects Out-of-Order (OOO) packets.

Traffic Generator can be used similar to bandwidth test tool as well as generate packets that will be routed back to packet generator for advanced status collection.”

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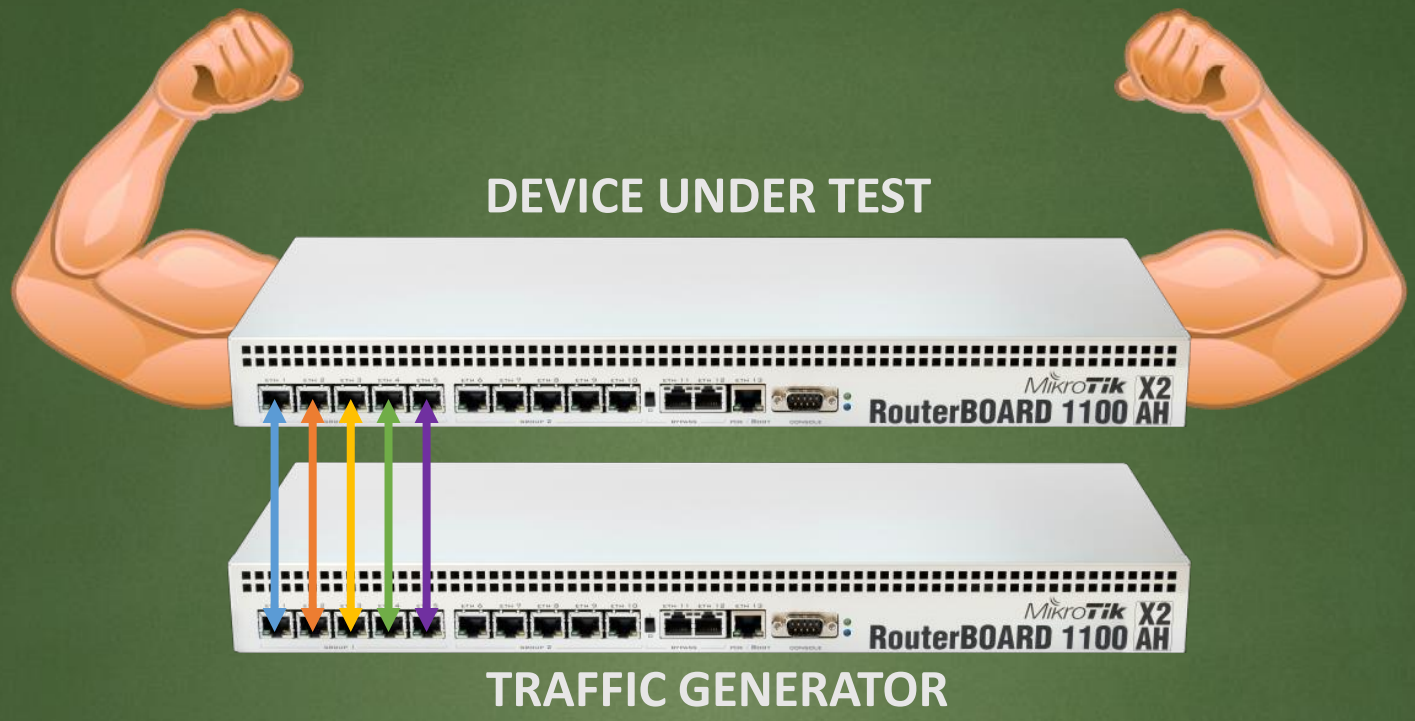

Test performance of device or system before migrate to production infrastructure such as :

- PPS (Packet Per Second)
- Throughput / Bandwidth
- CPU
- Hardware Encryption

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Test performance of link (wired or wireless) between sites :

- Latency
- Packet loss
- Jitter
- Bandwidth

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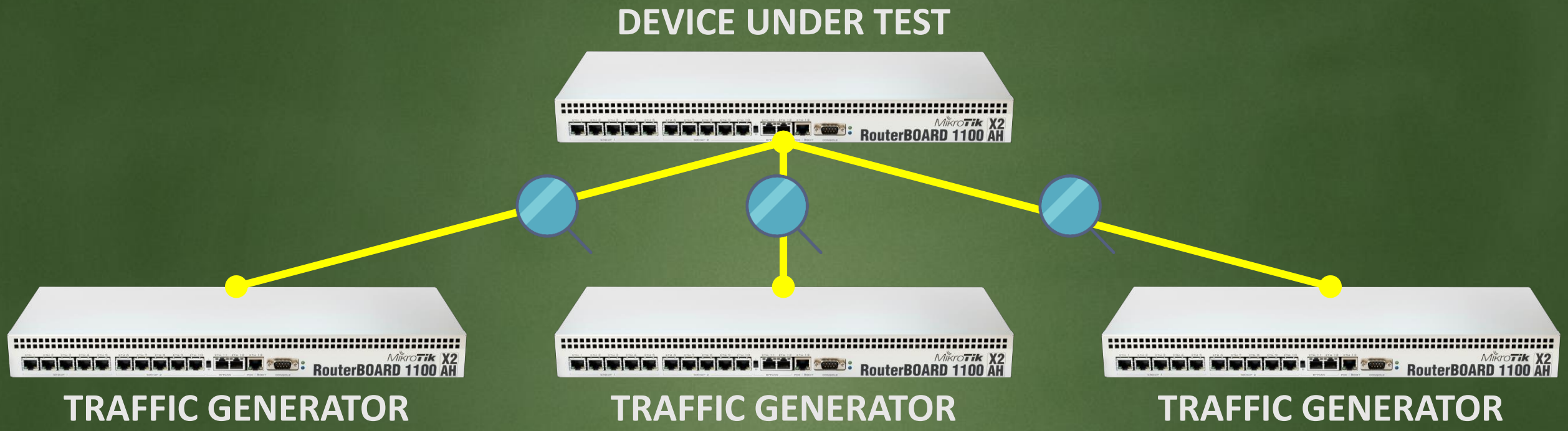

Polices (firewall or qos) test performance of device :

- Creating *"fabricated"* packets

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EXAMPLE

CASE 1

Simple Traffic Generator

TRAFFIC GENERATOR

DEVICE UNDER TEST

10.1.0.0/24

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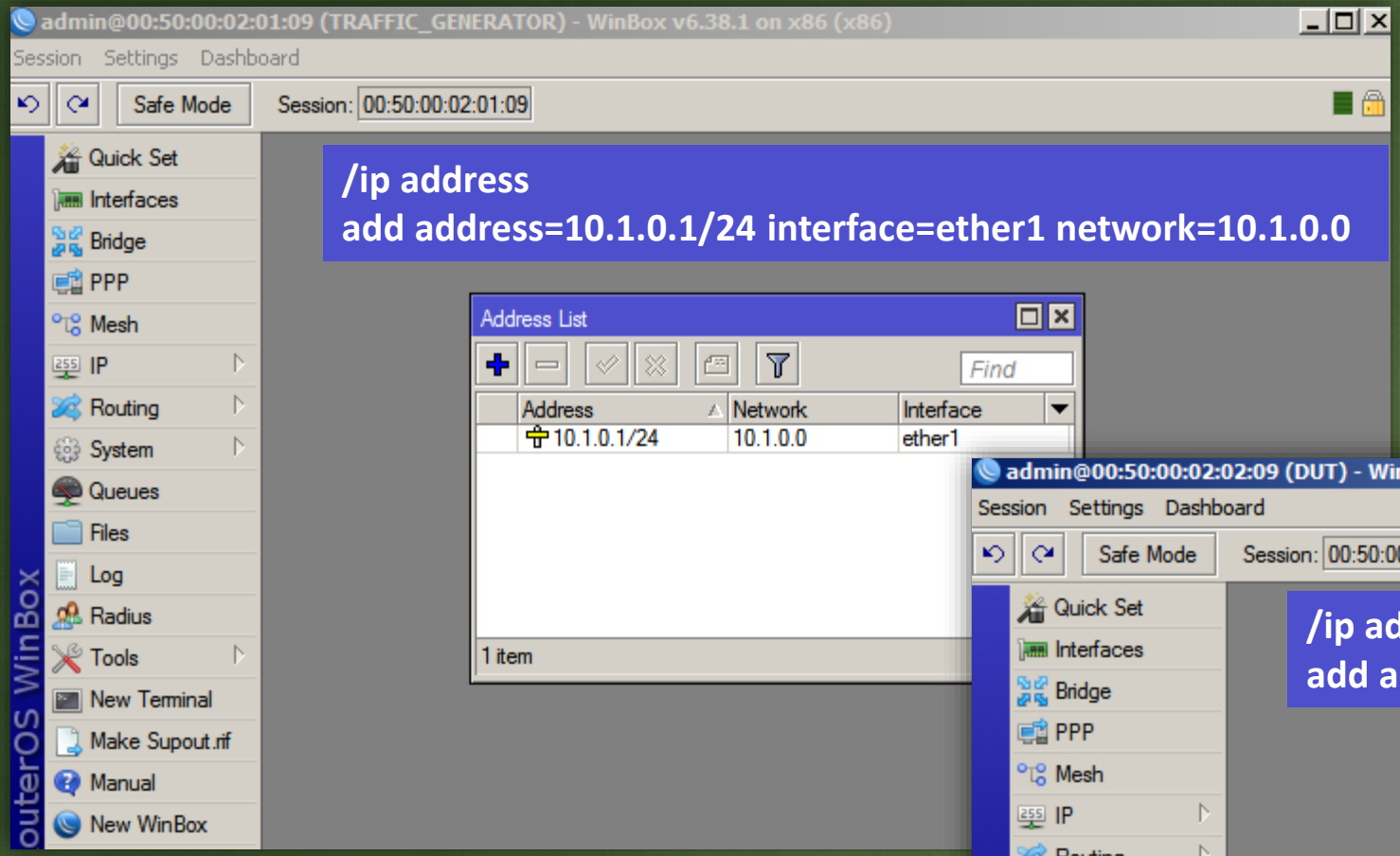
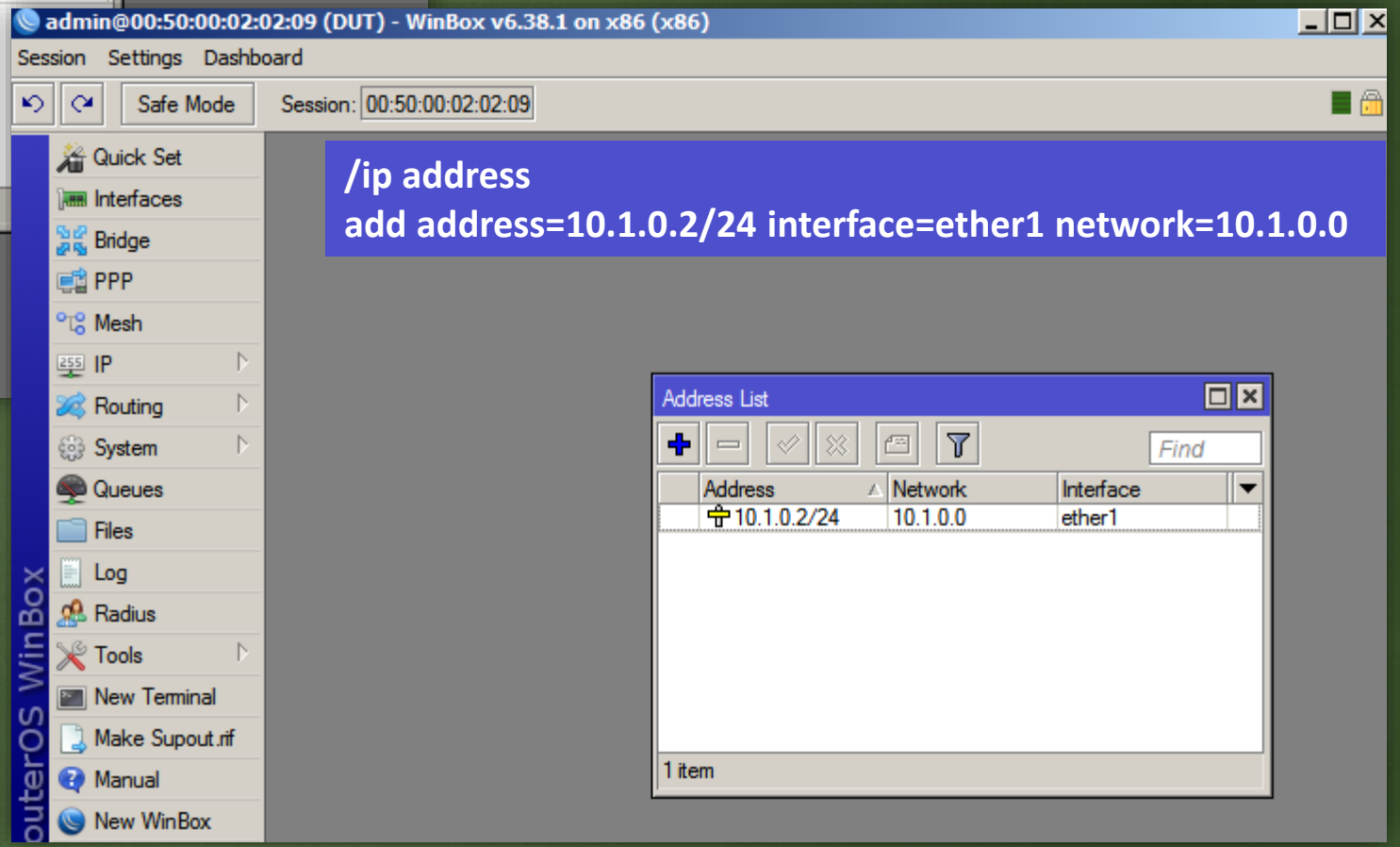

admin@00:50:00:02:01:09 (TRAFFIC_GENERATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
/ip address
add address=10.1.0.1/24 interface=ether1 network=10.1.0.0
Address List
Find
Address
Network
Interface
10.1.0.1/24
10.1.0.0
ether1
1 item


admin@00:50:00:02:02:09 (DUT) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:02:09
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
/ip address
add address=10.1.0.2/24 interface=ether1 network=10.1.0.0
Address List
Find
Address
Network
Interface
10.1.0.2/24
10.1.0.0
ether1
1 item

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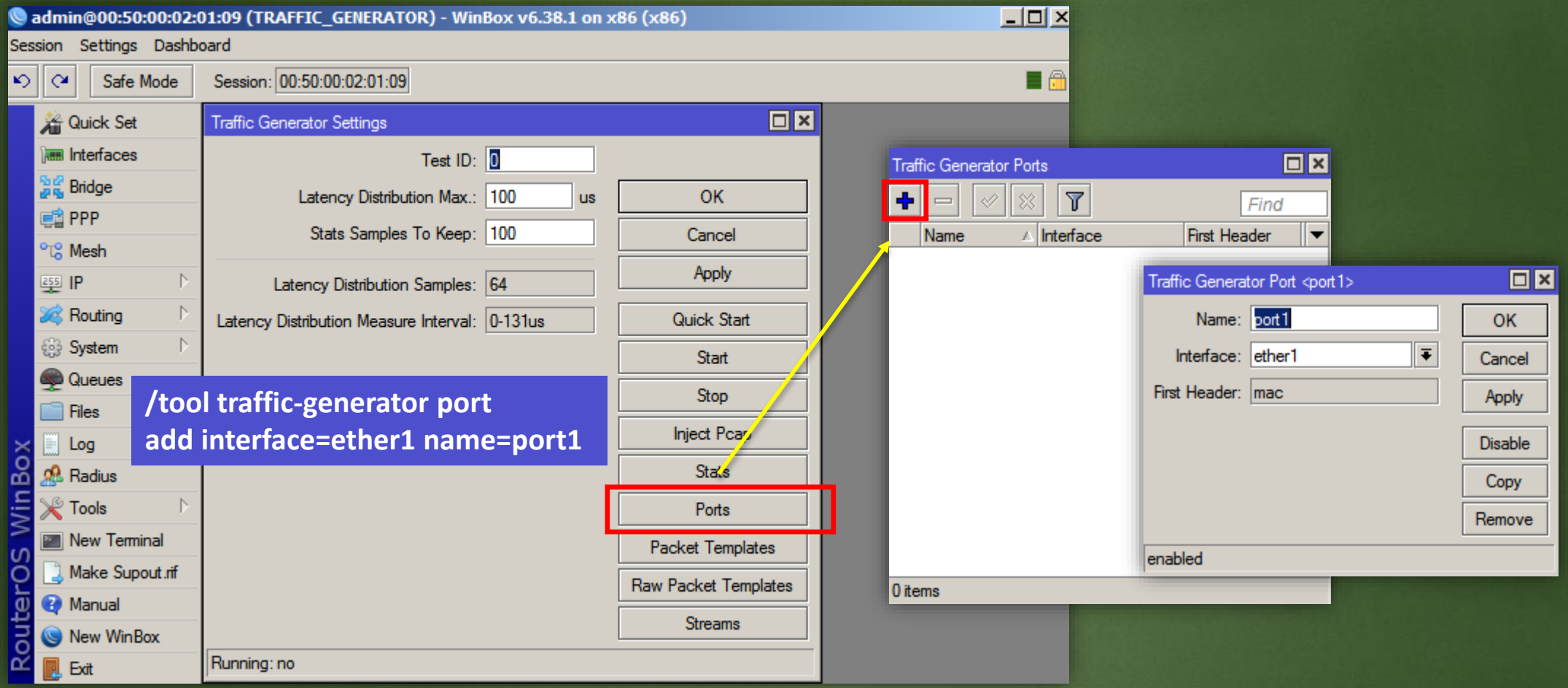
PORT
TEMPLATE
STREAM


admin@00:50:00:02:01:09 (TRAFFIC_GENERATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
RouterOS WinBox
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: no
/tool traffic-generator port
add interface=ether1 name=port1
Traffic Generator Ports
Find
Name
Interface
First Header
0 items
Traffic Generator Port <port1>
Name: port1
Interface: ether1
First Header: mac
OK
Cancel
Apply
Disable
Copy
Remove
enabled

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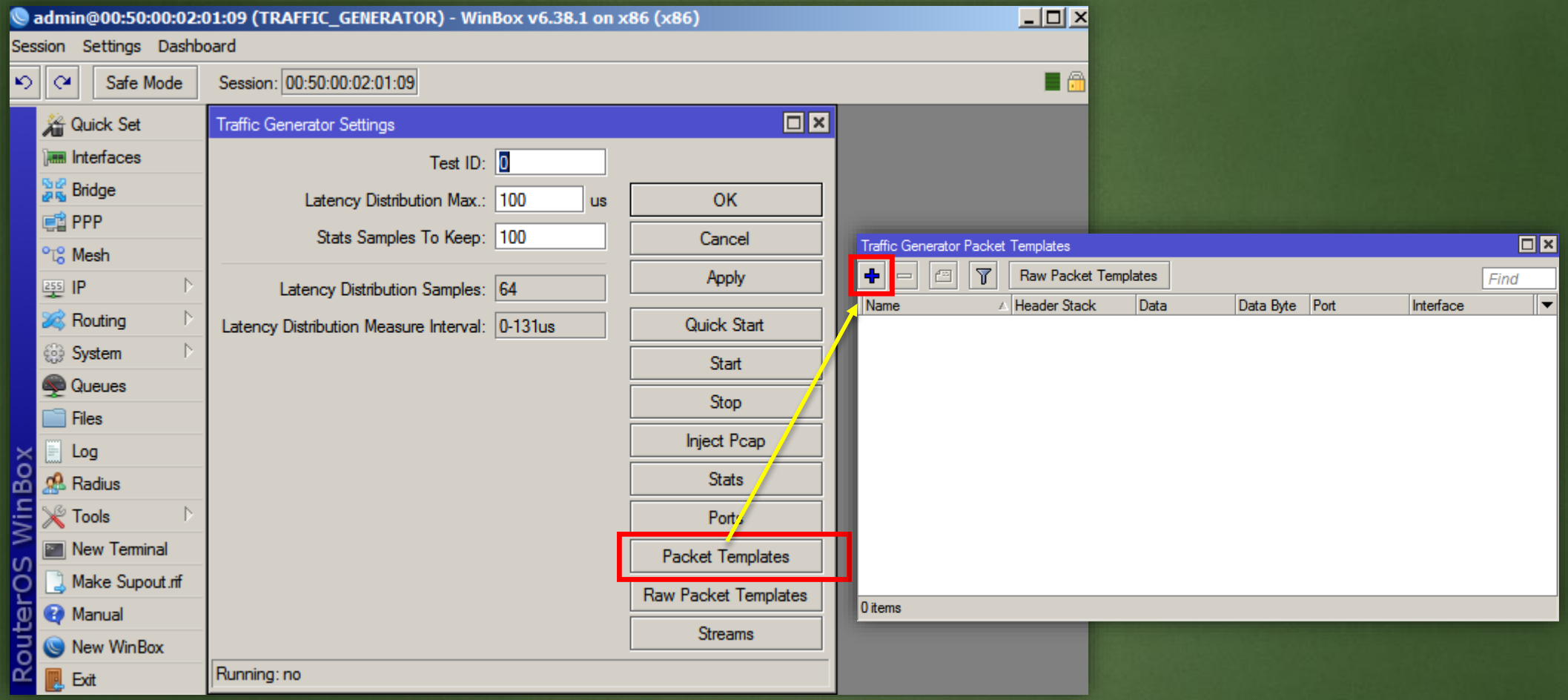
admin@00:50:00:02:01:09 (TRAFFIC_GENERATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
RouterOS WinBox
Quick Set
Interfaces
Bridge
PPP
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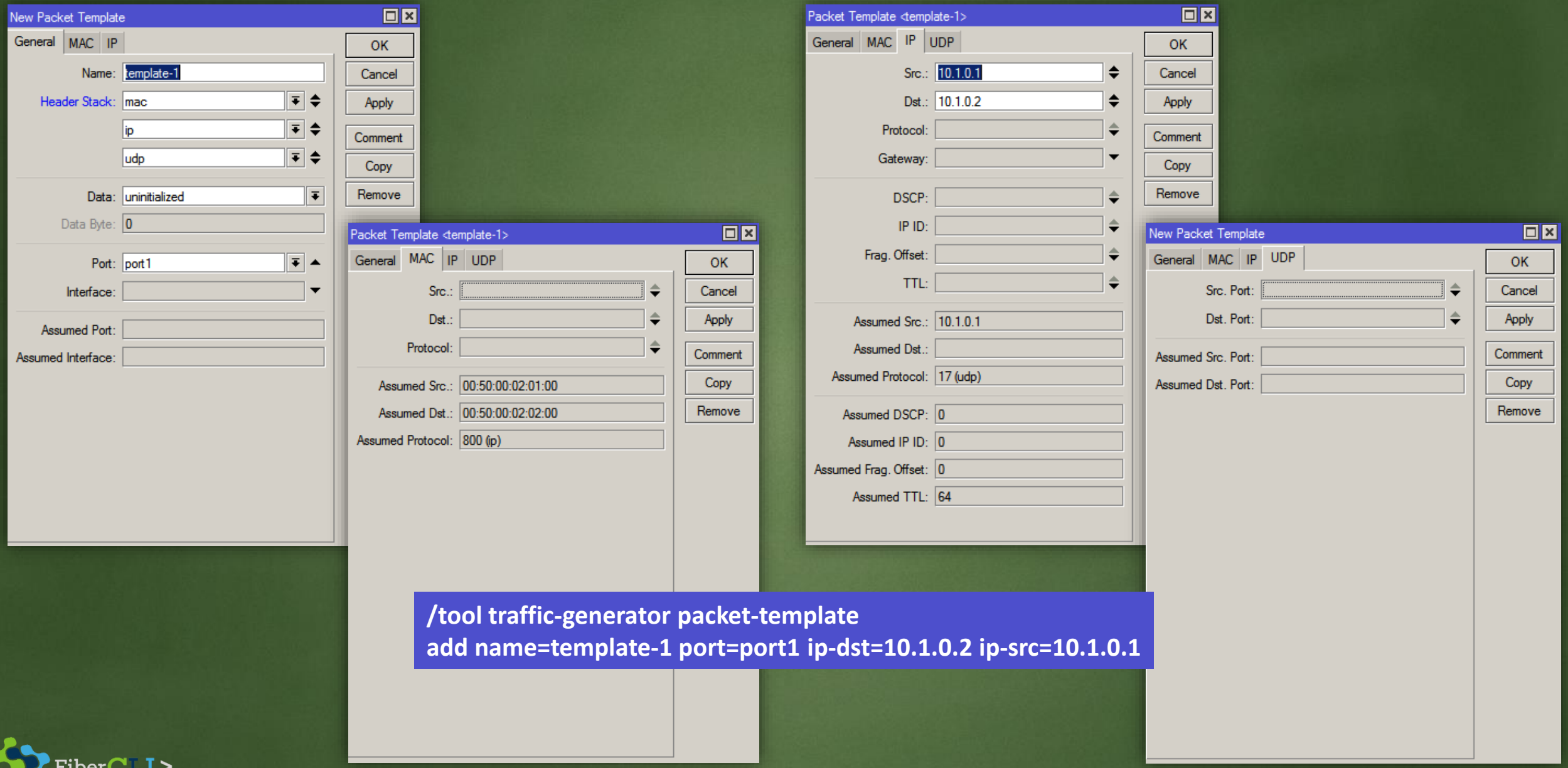
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: no
Traffic Generator Packet Templates
Raw Packet Templates
Find
Name
Header Stack
Data
Data Byte
Port
Interface
0 items




```
/tool traffic-generator packet-template
add name=template-1 port=port1 ip-dst=10.1.0.2 ip-src=10.1.0.1
```

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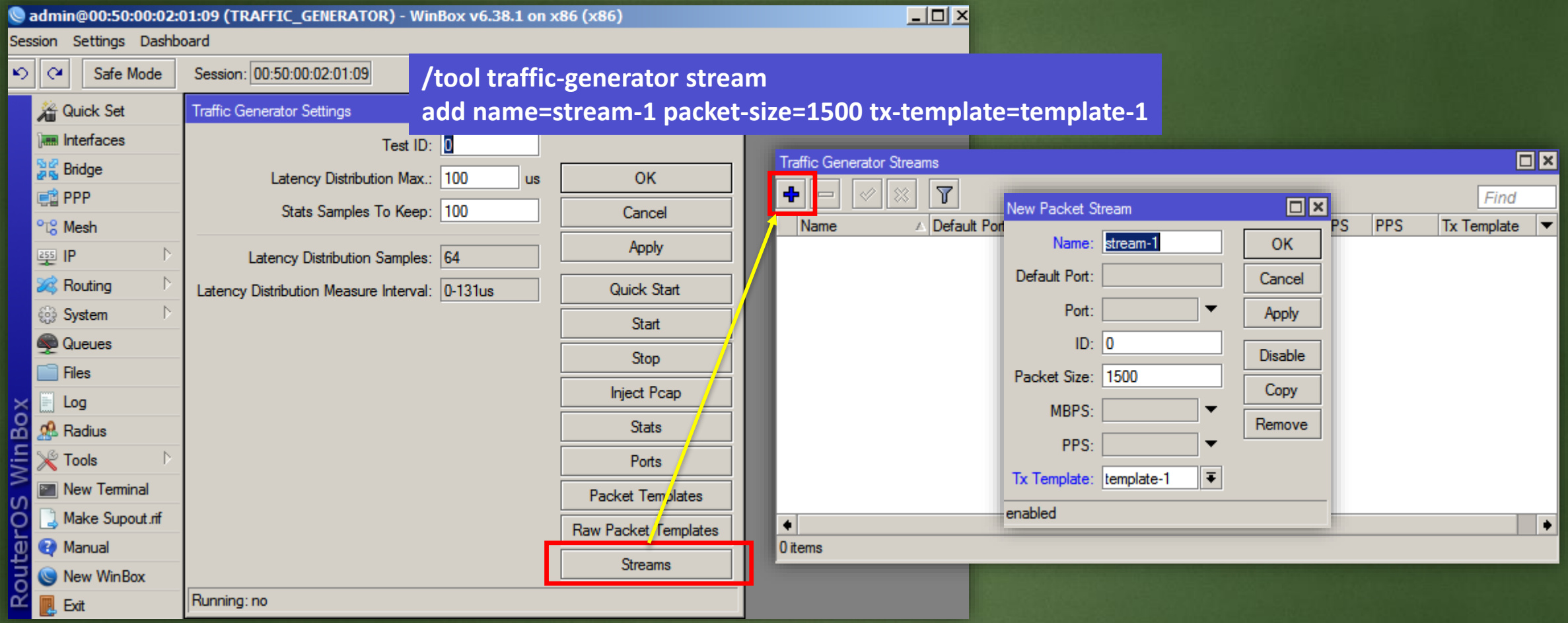
admin@00:50:00:02:01:09 (TRAFFIC_GENERATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
/tool traffic-generator stream
add name=stream-1 packet-size=1500 tx-template=template-1
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: no
Traffic Generator Streams
Find
Name
Default Port
PPS
Tx Template
New Packet Stream
Name: stream-1
Default Port:
Port:
ID: 0
Packet Size: 1500
MBPS:
PPS:
Tx Template: template-1
OK
Cancel
Apply
Disable
Copy
Remove
enabled
0 items

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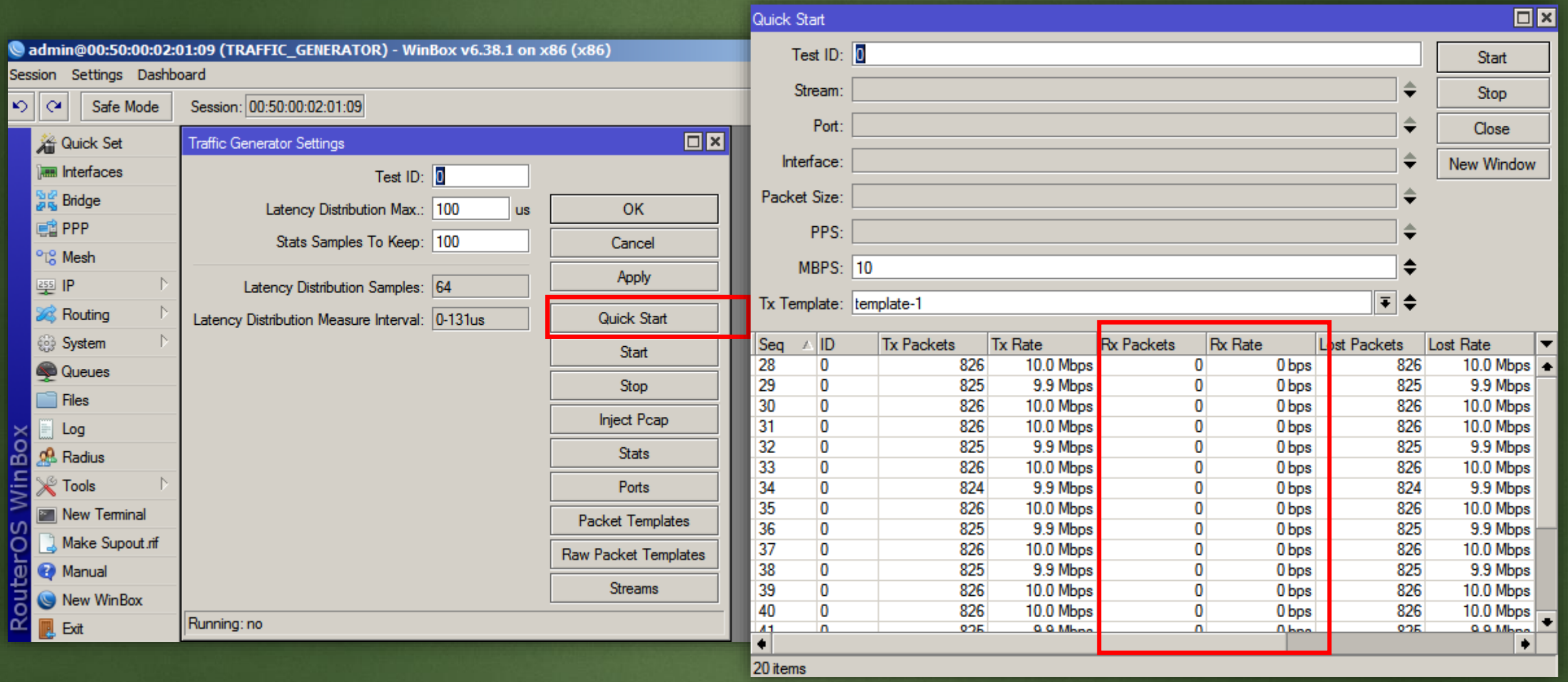
admin@00:50:00:02:01:09 (TRAFFIC_GENERATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
Quick Set
Interfaces
Bridge
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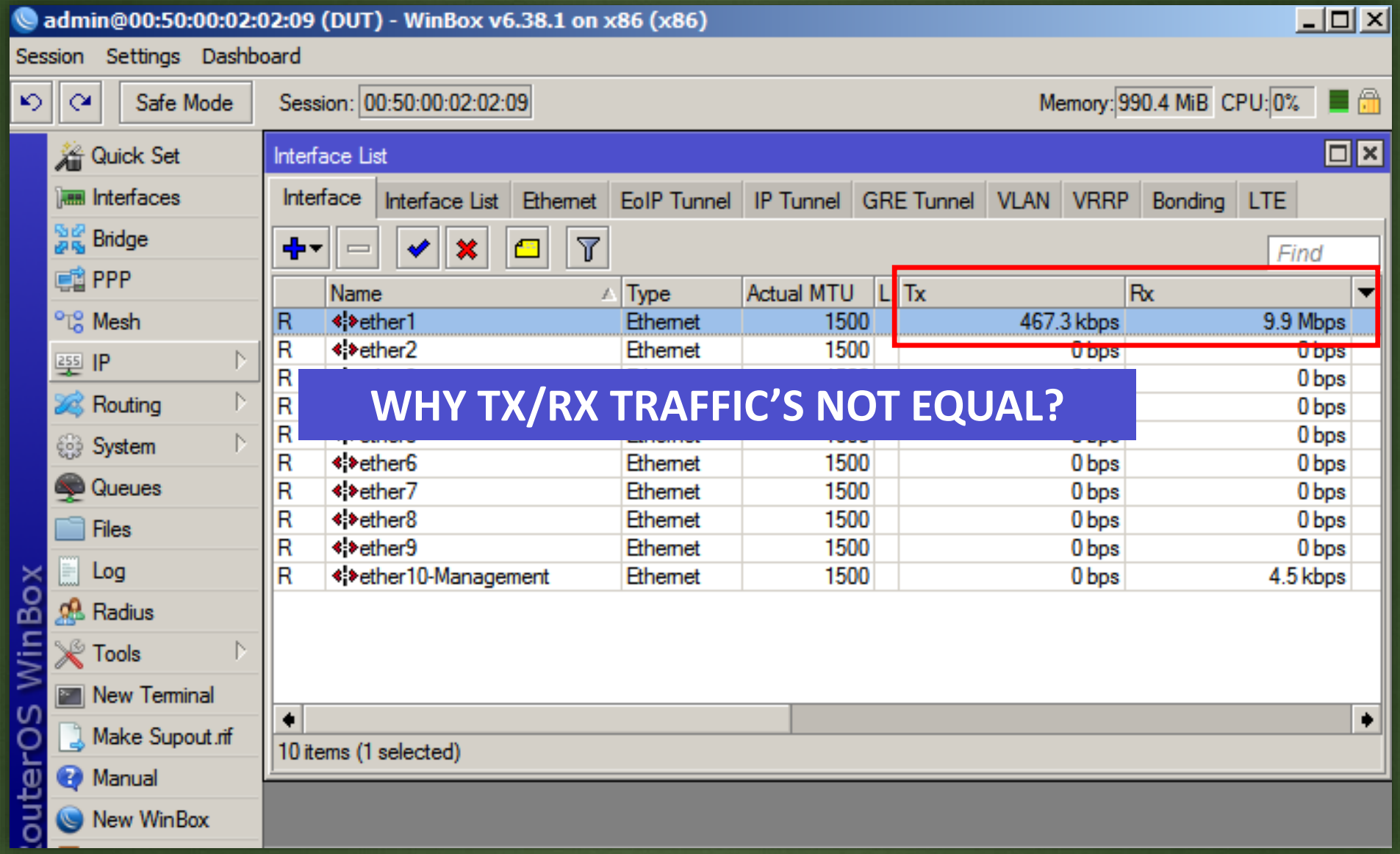
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: no
Quick Start
Test ID: 0
Stream:
Port:
Interface:
Packet Size:
PPS:
MBPS: 10
Tx Template: template-1
Start
Stop
Close
New Window
Seq ID Tx Packets Tx Rate Rx Packets Rx Rate Lost Packets Lost Rate
28 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
29 0 825 9.9 Mbps 0 0 bps 825 9.9 Mbps
30 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
31 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
32 0 825 9.9 Mbps 0 0 bps 825 9.9 Mbps
33 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
34 0 824 9.9 Mbps 0 0 bps 824 9.9 Mbps
35 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
36 0 825 9.9 Mbps 0 0 bps 825 9.9 Mbps
37 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
38 0 825 9.9 Mbps 0 0 bps 825 9.9 Mbps
39 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
40 0 826 10.0 Mbps 0 0 bps 826 10.0 Mbps
20 items


admin@00:50:00:02:02:09 (DUT) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:02:09
Memory: 990.4 MiB CPU: 0%
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface List
Interface
Interface List
Ethernet
EoIP Tunnel
IP Tunnel
GRE Tunnel
VLAN
VRRP
Bonding
LTE
Find
Name
Type
Actual MTU
L
Tx
Rx
R ether1 Ethernet 1500 467.3 kbps 9.9 Mbps
R ether2 Ethernet 1500 0 bps 0 bps
R 0 bps
R 0 bps
R 0 bps
R ether6 Ethernet 1500 0 bps 0 bps
R ether7 Ethernet 1500 0 bps 0 bps
R ether8 Ethernet 1500 0 bps 0 bps
R ether9 Ethernet 1500 0 bps 0 bps
R ether10-Management Ethernet 1500 0 bps 4.5 kbps
10 items (1 selected)
WHY TX/RX TRAFFIC'S NOT EQUAL?

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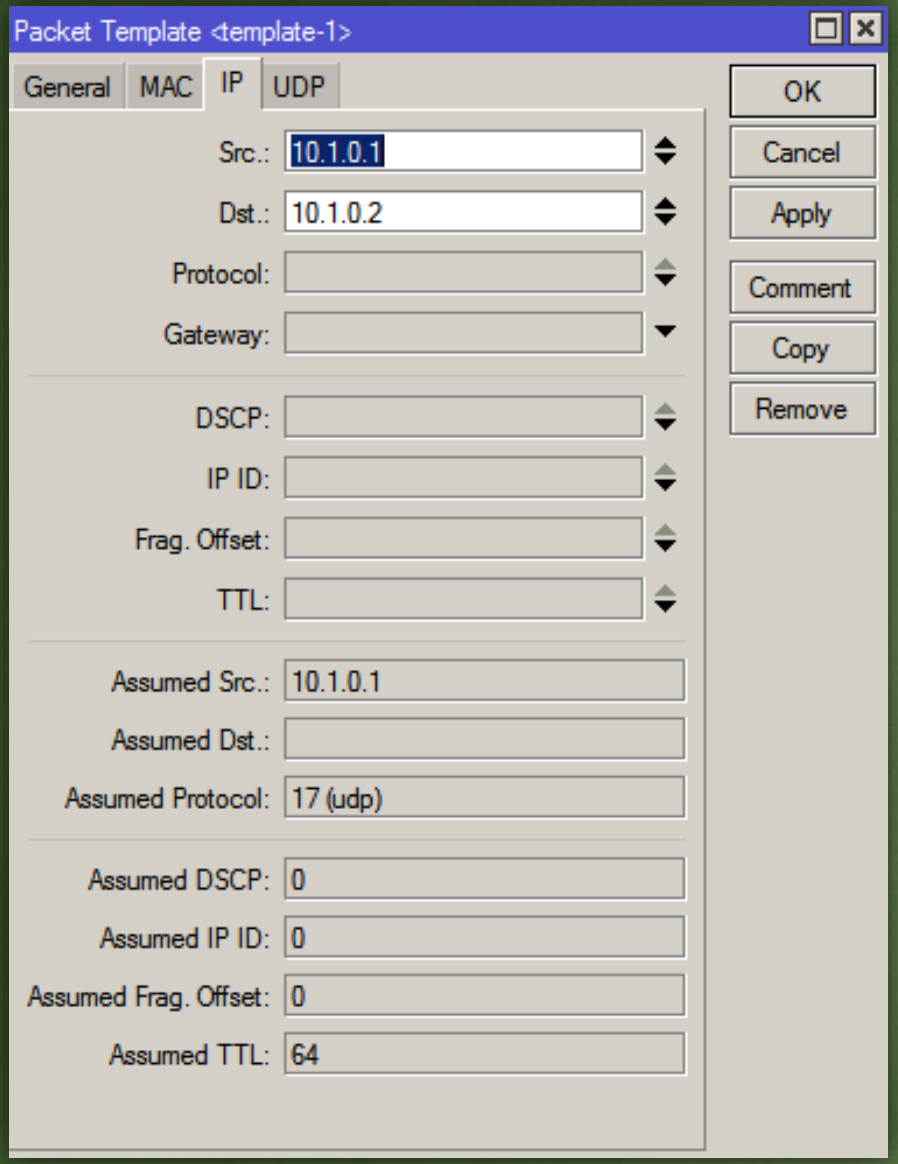
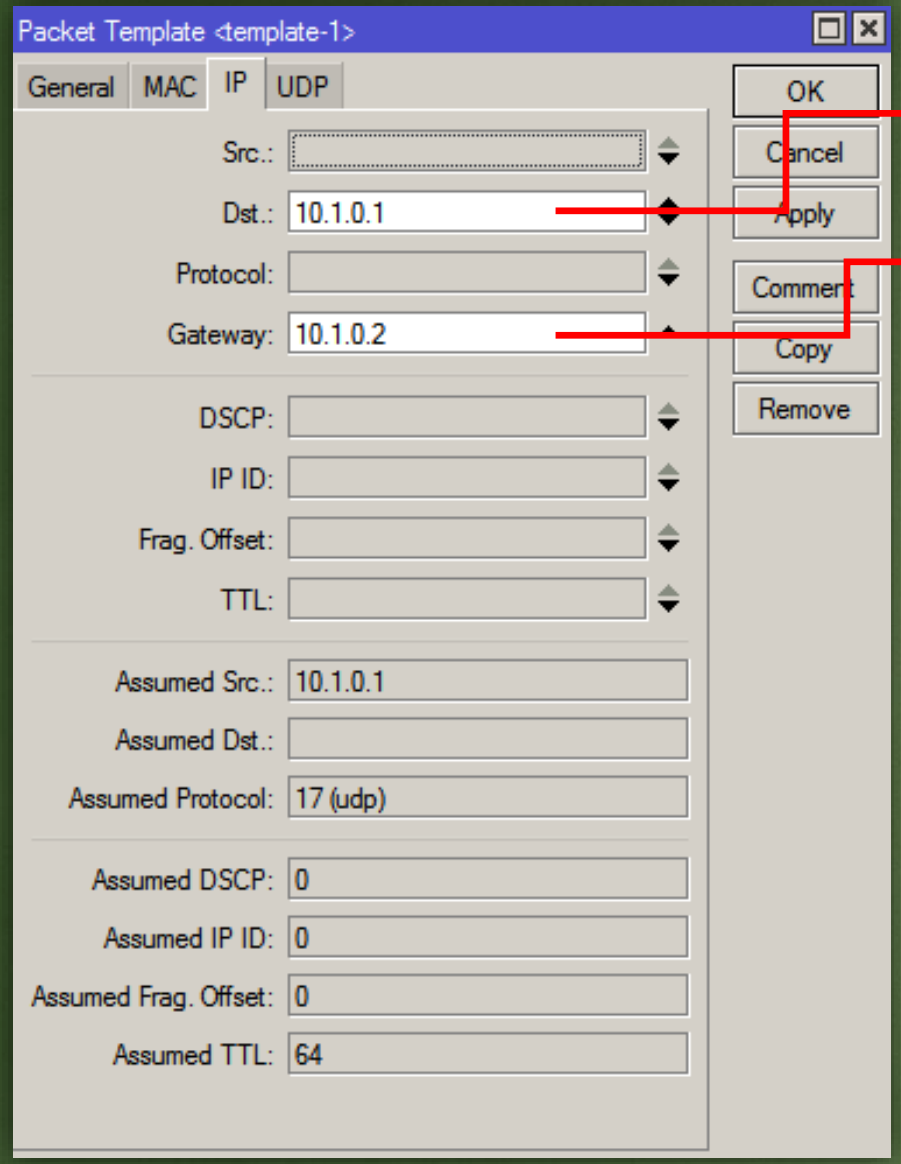


Because we only send (tx) traffic to the destination address as above, DUT/SUT only receive traffic without sending the packet back



Ip address ether1 on Traffic-Generator device

Ip address ether1 on DUT/SUT device

We change the template in the “IP” section like this.

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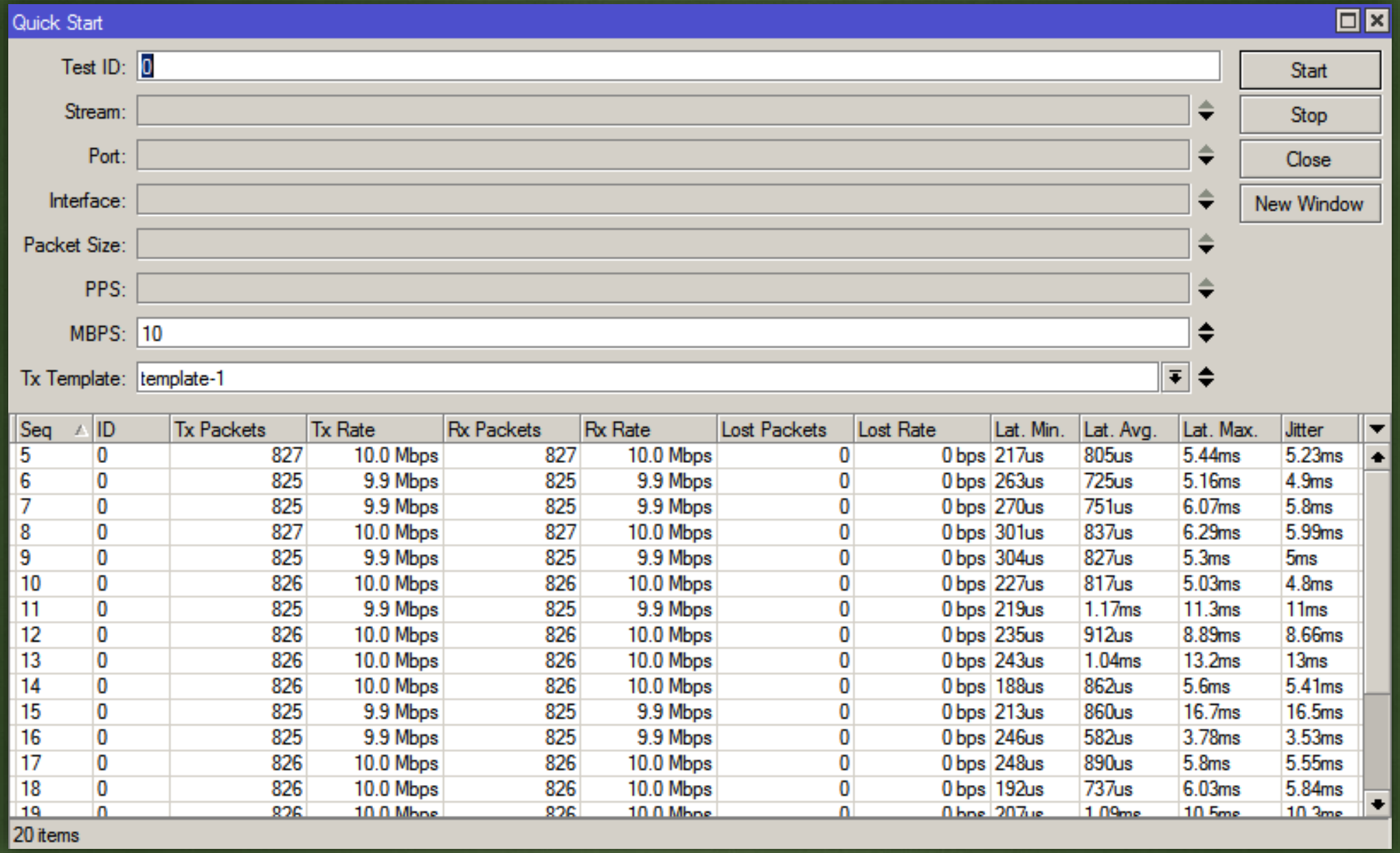
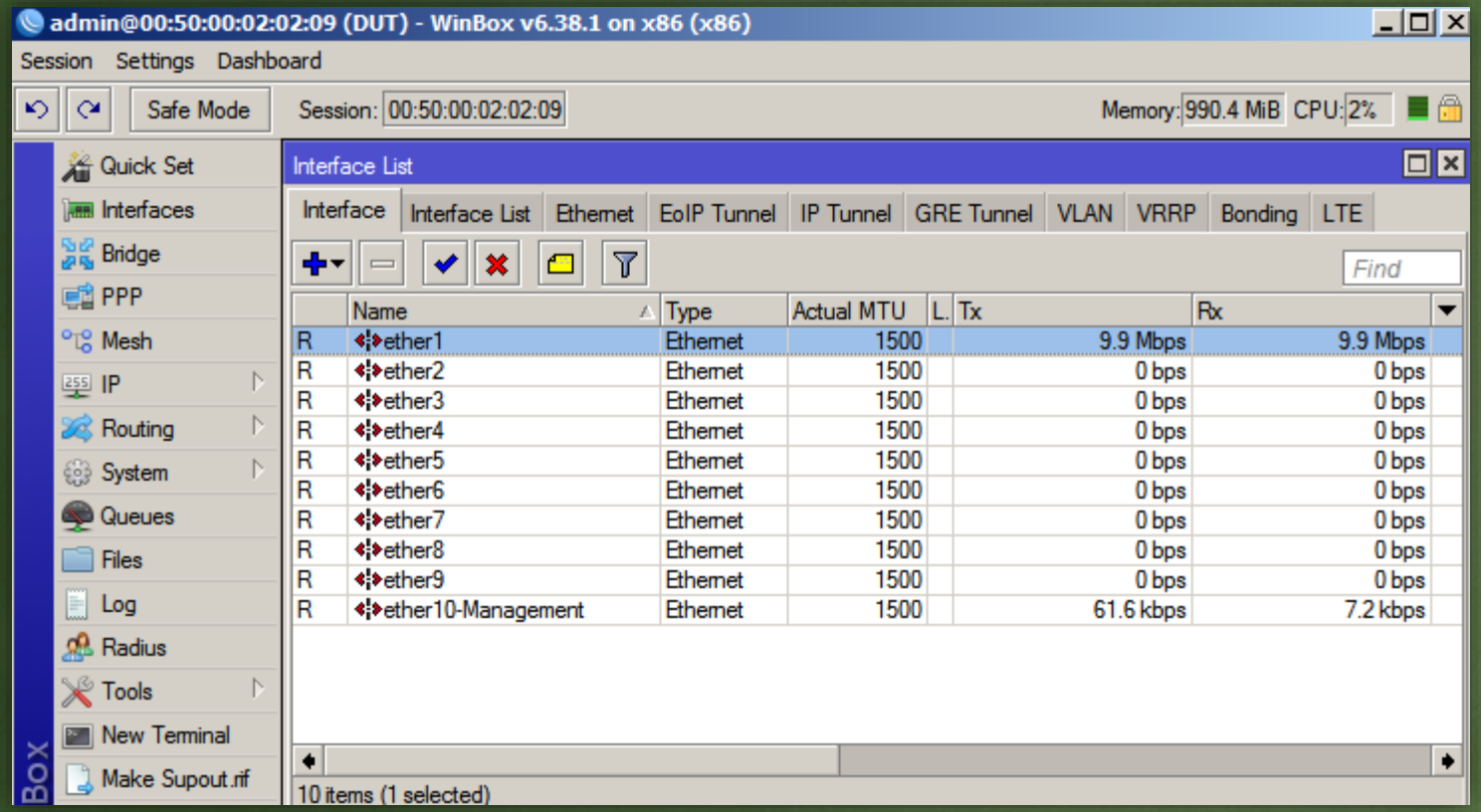
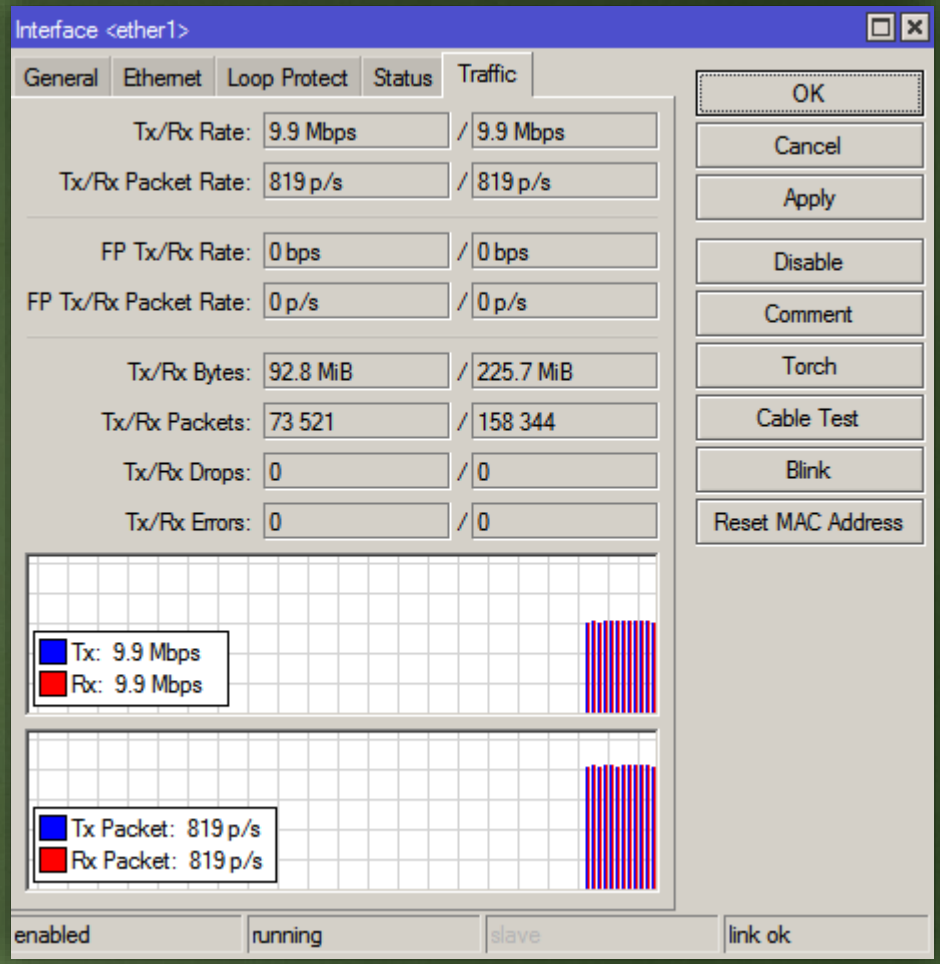

Quick Start
Test ID: 0
Stream:
Port:
Interface:
Packet Size:
PPS:
MBPS: 10
Tx Template: template-1
Start
Stop
Close
New Window
Seq | ID | Tx Packets | Tx Rate | Rx Packets | Rx Rate | Lost Packets | Lost Rate | Lat. Min. | Lat. Avg. | Lat. Max. | Jitter
5 | 0 | 827 | 10.0 Mbps | 827 | 10.0 Mbps | 0 | 0 bps | 217us | 805us | 5.44ms | 5.23ms
6 | 0 | 825 | 9.9 Mbps | 825 | 9.9 Mbps | 0 | 0 bps | 263us | 725us | 5.16ms | 4.9ms
7 | 0 | 825 | 9.9 Mbps | 825 | 9.9 Mbps | 0 | 0 bps | 270us | 751us | 6.07ms | 5.8ms
8 | 0 | 827 | 10.0 Mbps | 827 | 10.0 Mbps | 0 | 0 bps | 301us | 837us | 6.29ms | 5.99ms
9 | 0 | 825 | 9.9 Mbps | 825 | 9.9 Mbps | 0 | 0 bps | 304us | 827us | 5.3ms | 5ms
10 | 0 | 826 | 10.0 Mbps | 826 | 10.0 Mbps | 0 | 0 bps | 227us | 817us | 5.03ms | 4.8ms
11 | 0 | 825 | 9.9 Mbps | 825 | 9.9 Mbps | 0 | 0 bps | 219us | 1.17ms | 11.3ms | 11ms
12 | 0 | 826 | 10.0 Mbps | 826 | 10.0 Mbps | 0 | 0 bps | 235us | 912us | 8.89ms | 8.66ms
13 | 0 | 826 | 10.0 Mbps | 826 | 10.0 Mbps | 0 | 0 bps | 243us | 1.04ms | 13.2ms | 13ms
14 | 0 | 826 | 10.0 Mbps | 826 | 10.0 Mbps | 0 | 0 bps | 188us | 862us | 5.6ms | 5.41ms
15 | 0 | 825 | 9.9 Mbps | 825 | 9.9 Mbps | 0 | 0 bps | 213us | 860us | 16.7ms | 16.5ms
16 | 0 | 825 | 9.9 Mbps | 825 | 9.9 Mbps | 0 | 0 bps | 246us | 582us | 3.78ms | 3.53ms
17 | 0 | 826 | 10.0 Mbps | 826 | 10.0 Mbps | 0 | 0 bps | 248us | 890us | 5.8ms | 5.55ms
18 | 0 | 826 | 10.0 Mbps | 826 | 10.0 Mbps | 0 | 0 bps | 192us | 737us | 6.03ms | 5.84ms
20 items


admin@00:50:00:02:02:09 (DUT) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:02:09
Memory: 990.4 MiB CPU: 2%
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Interface List
Interface
Interface List
Ethernet
EoIP Tunnel
IP Tunnel
GRE Tunnel
VLAN
VRRP
Bonding
LTE
Find
Name
Type
Actual MTU
L.
Tx
Rx
R ether1 Ethernet 1500 9.9 Mbps 9.9 Mbps
R ether2 Ethernet 1500 0 bps 0 bps
R ether3 Ethernet 1500 0 bps 0 bps
R ether4 Ethernet 1500 0 bps 0 bps
R ether5 Ethernet 1500 0 bps 0 bps
R ether6 Ethernet 1500 0 bps 0 bps
R ether7 Ethernet 1500 0 bps 0 bps
R ether8 Ethernet 1500 0 bps 0 bps
R ether9 Ethernet 1500 0 bps 0 bps
R ether10-Management Ethernet 1500 61.6 kbps 7.2 kbps
10 items (1 selected)


Interface <ether1>
General
Ethernet
Loop Protect
Status
Traffic
OK
Cancel
Apply
Disable
Comment
Torch
Cable Test
Blink
Reset MAC Address
Tx/Rx Rate: 9.9 Mbps / 9.9 Mbps
Tx/Rx Packet Rate: 819 p/s / 819 p/s
FP Tx/Rx Rate: 0 bps / 0 bps
FP Tx/Rx Packet Rate: 0 p/s / 0 p/s
Tx/Rx Bytes: 92.8 MiB / 225.7 MiB
Tx/Rx Packets: 73 521 / 158 344
Tx/Rx Drops: 0 / 0
Tx/Rx Errors: 0 / 0
Tx: 9.9 Mbps
Rx: 9.9 Mbps
Tx Packet: 819 p/s
Rx Packet: 819 p/s
enabled
running
slave
link ok

CASE 2

Multi-Port Traffic Generator


TRAFFIC GENERATOR
DEVICE UNDER TEST
MikroTik X2
RouterBOARD 1100 AH
MikroTik X2
RouterBOARD 1100 AH

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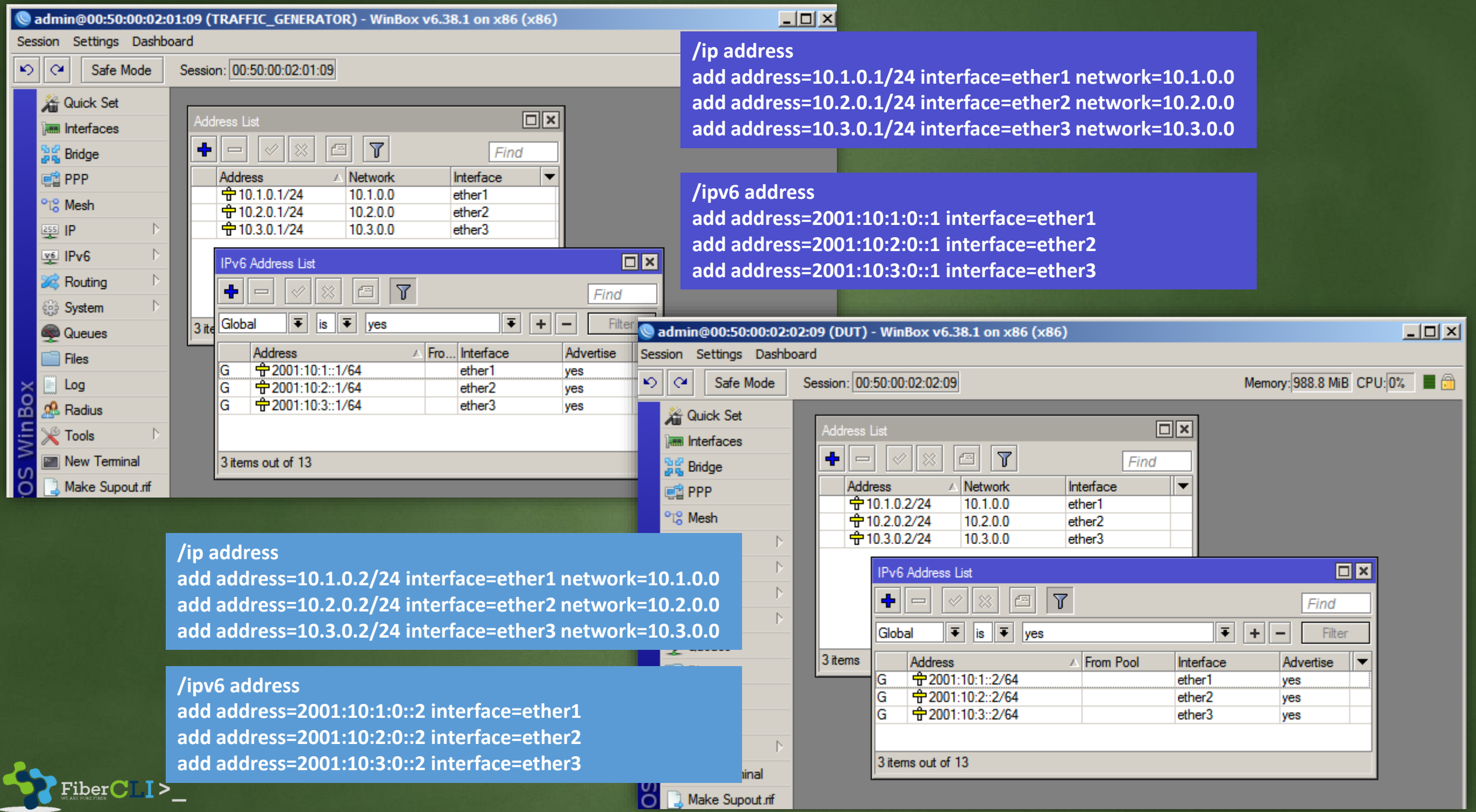
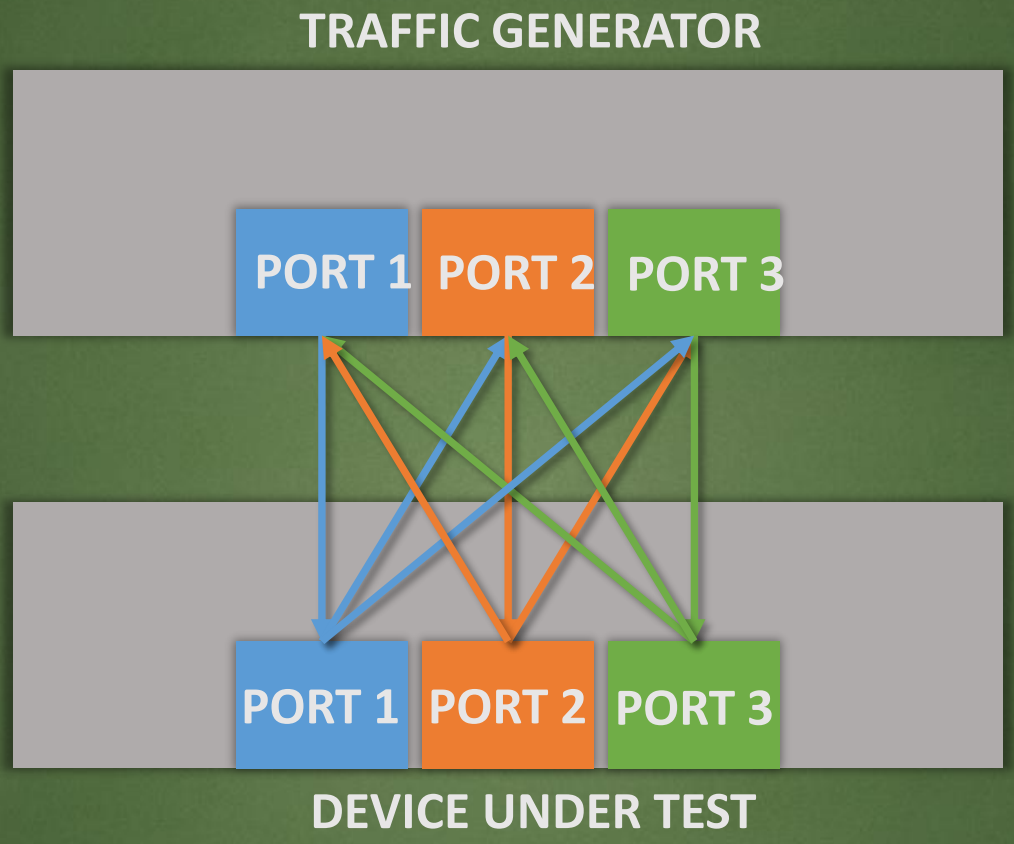
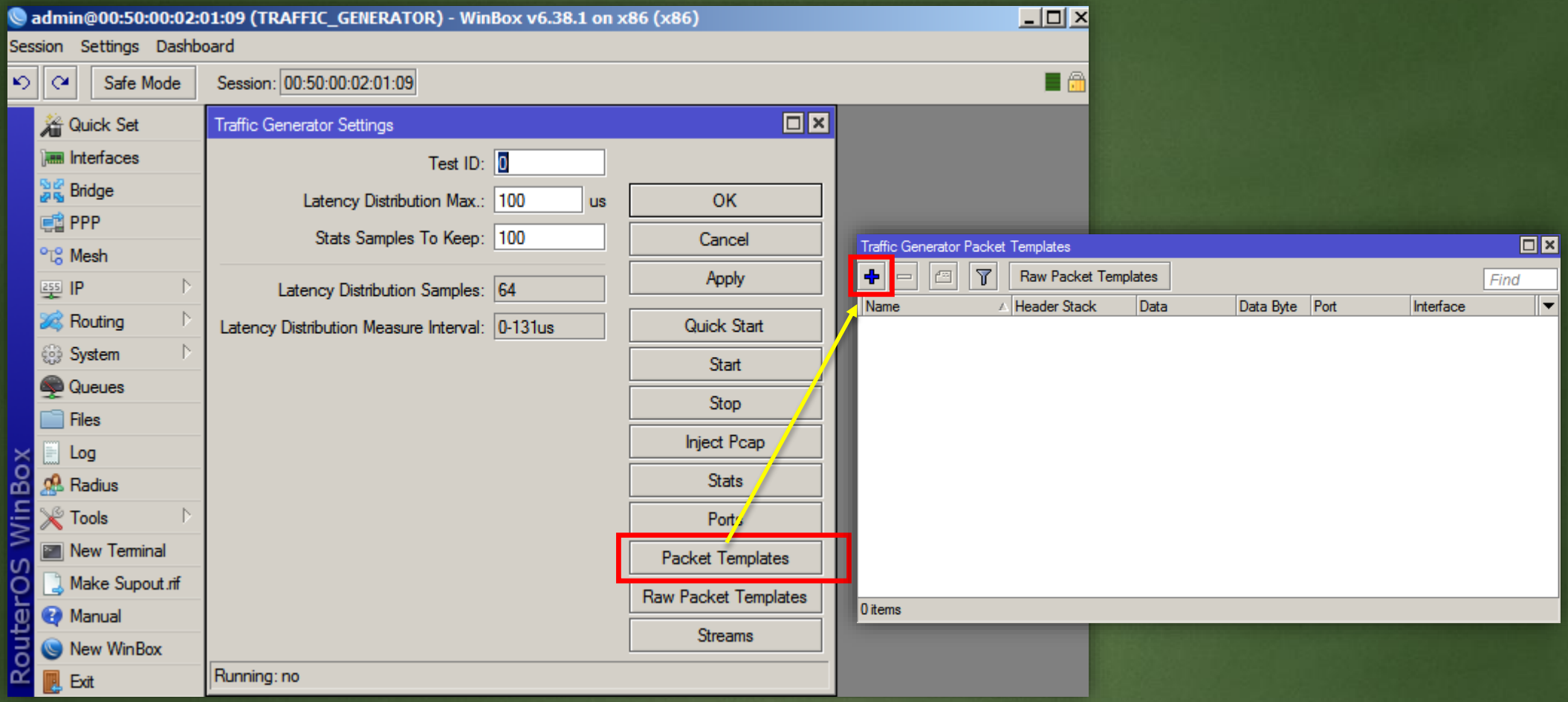
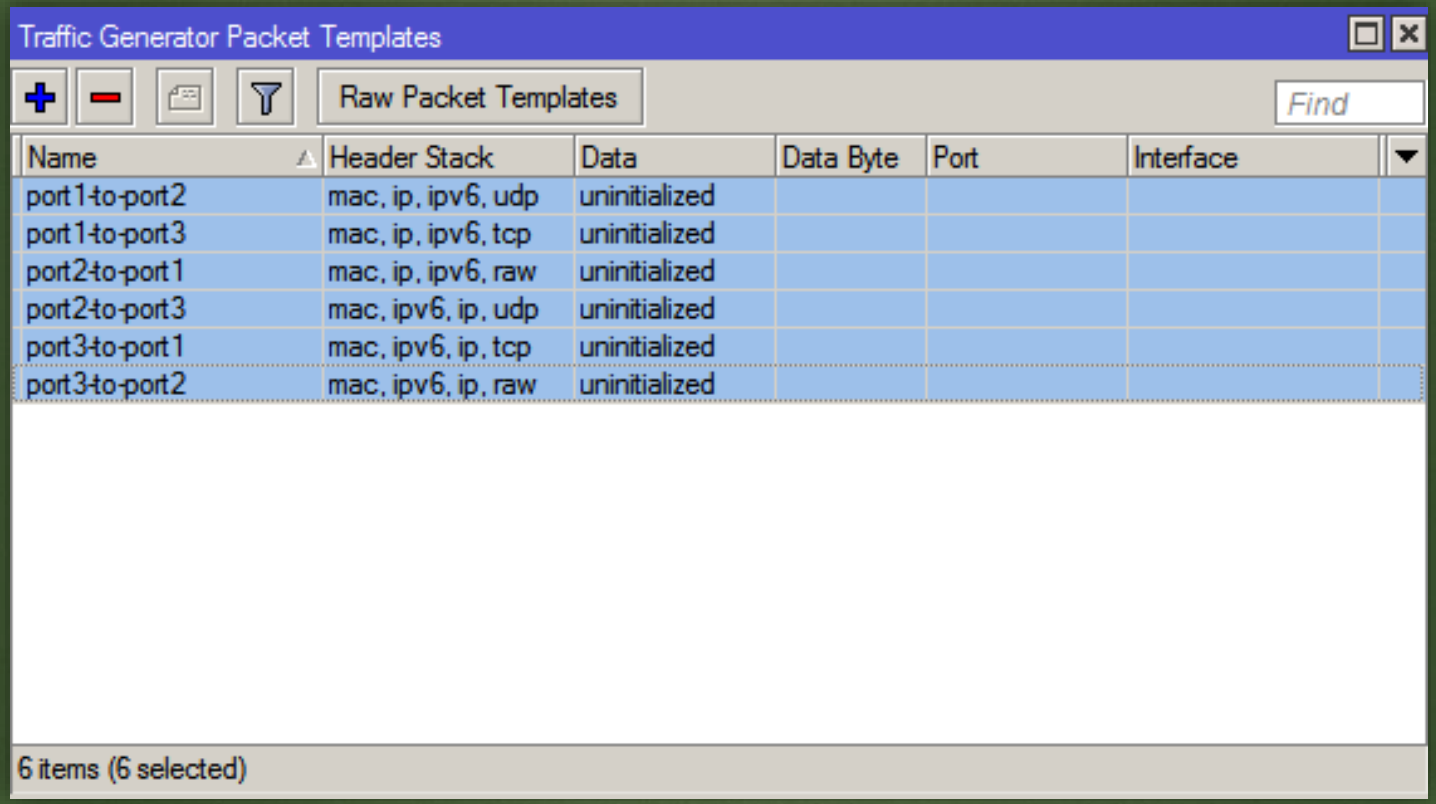

admin@00:50:00:02:01:09 (TRAFFIC_GENERATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
IPv6
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Address List
Find
Address Network Interface
10.1.0.1/24 10.1.0.0 ether1
10.2.0.1/24 10.2.0.0 ether2
10.3.0.1/24 10.3.0.0 ether3
IPv6 Address List
Global is yes
Filter
Address Fro... Interface Advertise
G 2001:10:1::1/64 ether1 yes
G 2001:10:2::1/64 ether2 yes
G 2001:10:3::1/64 ether3 yes
3 items out of 13
/ip address
add address=10.1.0.1/24 interface=ether1 network=10.1.0.0
add address=10.2.0.1/24 interface=ether2 network=10.2.0.0
add address=10.3.0.1/24 interface=ether3 network=10.3.0.0
/ipv6 address
add address=2001:10:1:0::1 interface=ether1
add address=2001:10:2:0::1 interface=ether2
add address=2001:10:3:0::1 interface=ether3
admin@00:50:00:02:02:09 (DUT) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:02:09
Memory: 988.8 MiB CPU: 0%
Address List
Address Network Interface
10.1.0.2/24 10.1.0.0 ether1
10.2.0.2/24 10.2.0.0 ether2
10.3.0.2/24 10.3.0.0 ether3
IPv6 Address List
Global is yes
Filter
Address From Pool Interface Advertise
G 2001:10:1::2/64 ether1 yes
G 2001:10:2::2/64 ether2 yes
G 2001:10:3::2/64 ether3 yes
3 items out of 13
/ip address
add address=10.1.0.2/24 interface=ether1 network=10.1.0.0
add address=10.2.0.2/24 interface=ether2 network=10.2.0.0
add address=10.3.0.2/24 interface=ether3 network=10.3.0.0
/ipv6 address
add address=2001:10:1:0::2 interface=ether1
add address=2001:10:2:0::2 interface=ether2
add address=2001:10:3:0::2 interface=ether3
FiberCLI >_

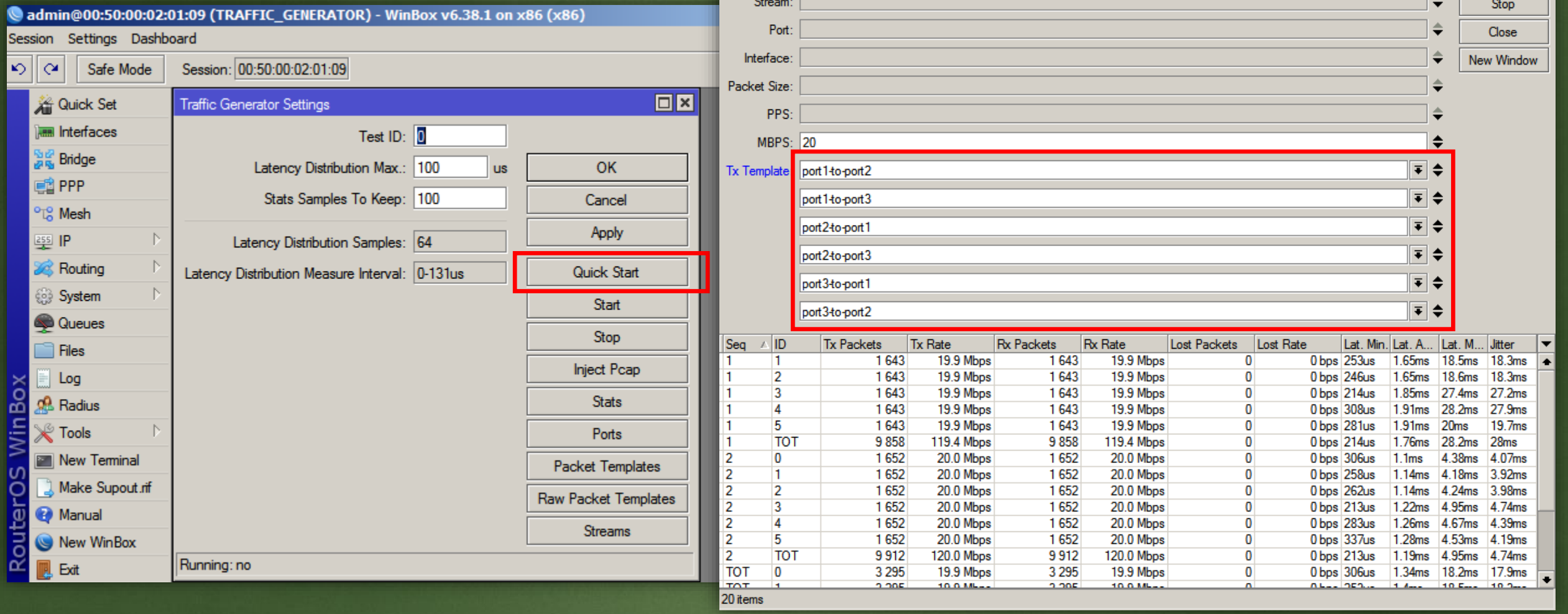

TEMPLATES
START

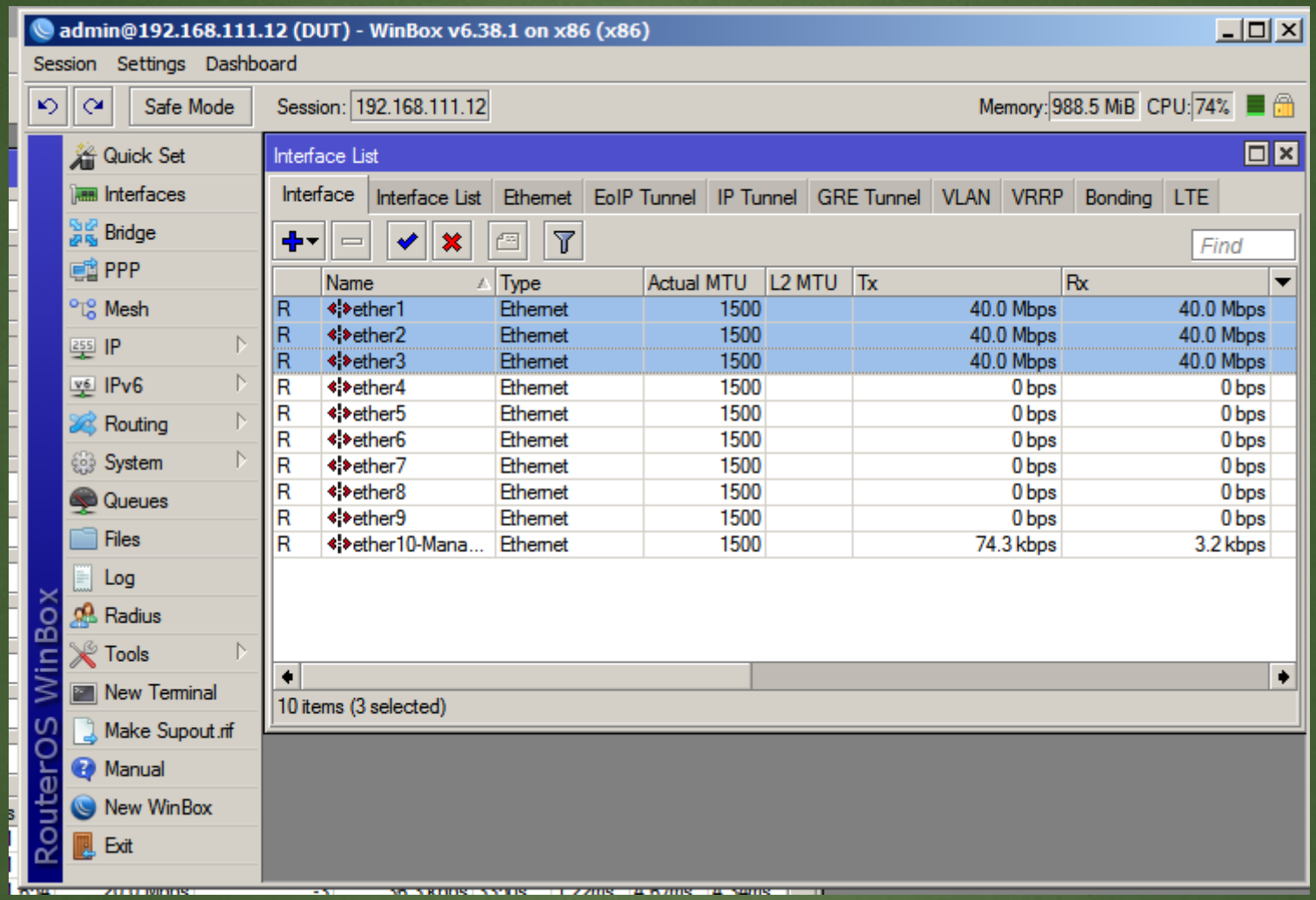

TRAFFIC GENERATOR
PORT 1
PORT 2
PORT 3
PORT 1
PORT 2
PORT 3
DEVICE UNDER TEST

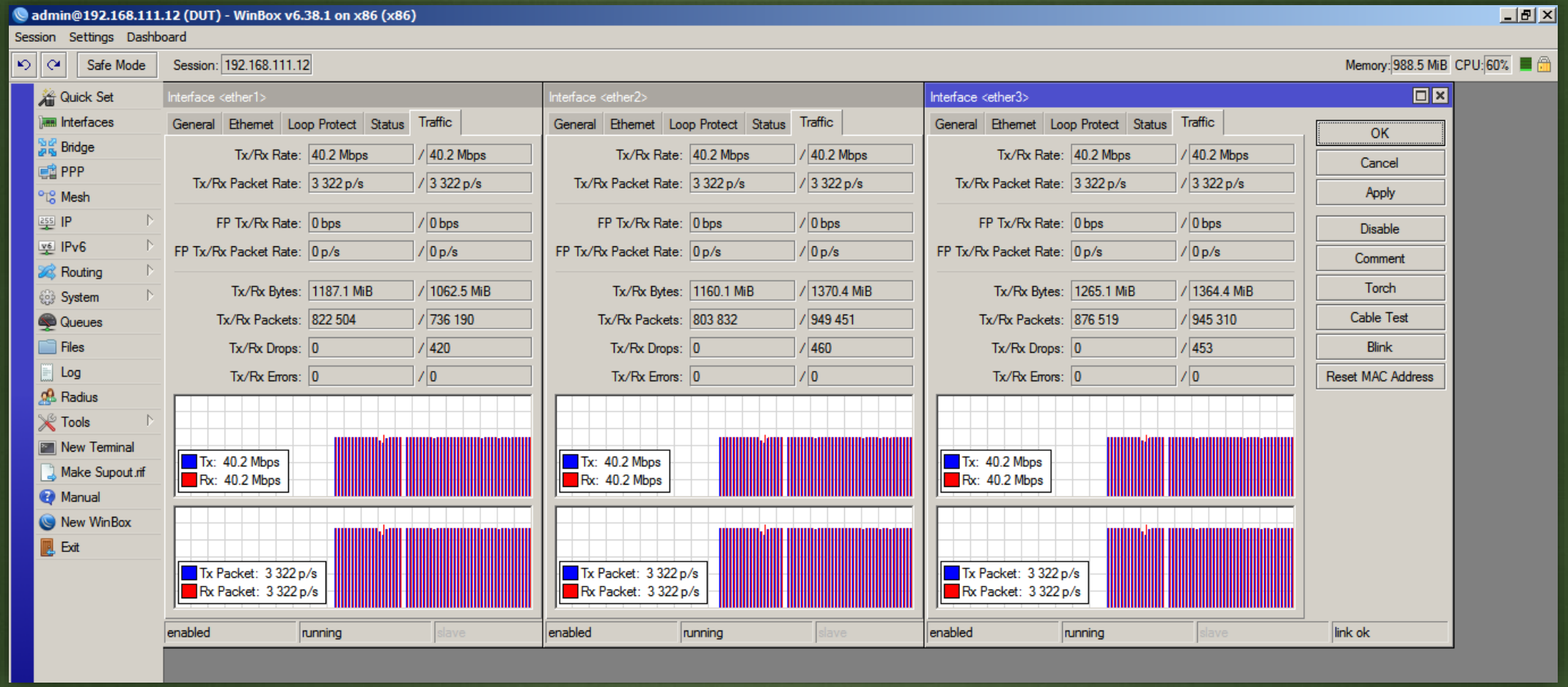


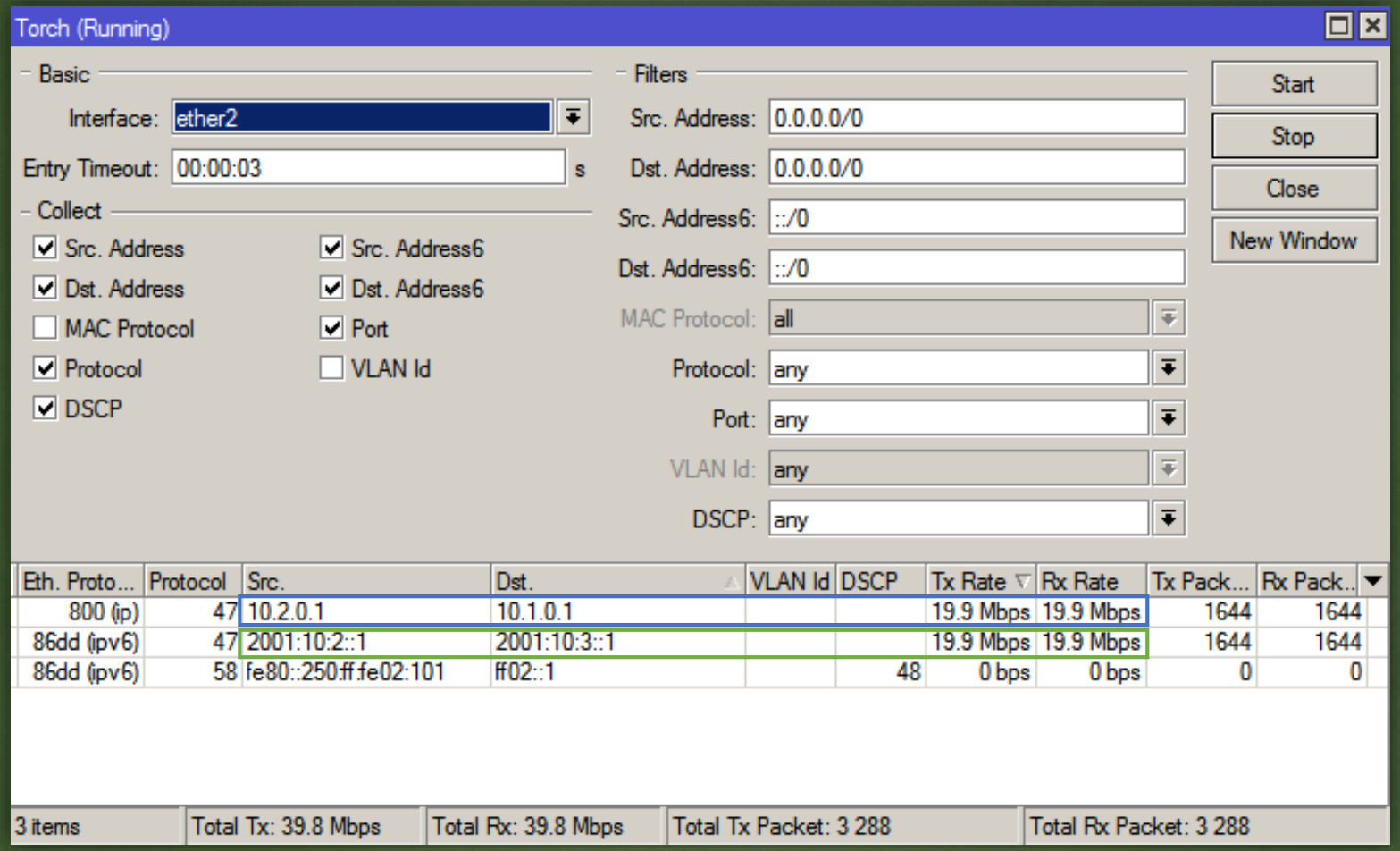

```
/tool traffic-generator packet-template
add header-stack=mac,ip,ipv6,udp ip-dst=10.2.0.1 ip-gateway=10.1.0.2 ipv6-dst=2001:10:2::1/128 ipv6-gateway=2001:10:1::2 name=port1-to-port2
add header-stack=mac,ip,ipv6,tcp ip-dst=10.3.0.1 ip-gateway=10.1.0.2 ipv6-dst=2001:10:3::1/128 ipv6-gateway=2001:10:1::2 name=port1-to-port3
add header-stack=mac,ip,ipv6,raw ip-dst=10.1.0.1 ip-gateway=10.2.0.2 ipv6-dst=2001:10:1::1/128 ipv6-gateway=2001:10:2::2 name=port2-to-port1
add header-stack=mac,ipv6,ip,udp ip-dst=10.3.0.1 ip-gateway=10.2.0.2 ipv6-dst=2001:10:3::1/128 ipv6-gateway=2001:10:2::2 name=port2-to-port3
add header-stack=mac,ipv6,ip,tcp ip-dst=10.1.0.1 ip-gateway=10.3.0.2 ipv6-dst=2001:10:1::1/128 ipv6-gateway=2001:10:3::2 name=port3-to-port1
add header-stack=mac,ipv6,ip,raw ip-dst=10.2.0.1 ip-gateway=10.3.0.2 ipv6-dst=2001:10:2::1/128 ipv6-gateway=2001:10:3::2 name=port3-to-port2
```


Traffic Generator Packet Templates
Raw Packet Templates
Find
Name
Header Stack
Data
Data Byte
Port
Interface
port1-to-port2
mac, ip, ipv6, udp
uninitialized
port1-to-port3
mac, ip, ipv6, tcp
uninitialized
port2-to-port1
mac, ip, ipv6, raw
uninitialized
port2-to-port3
mac, ipv6, ip, udp
uninitialized
port3-to-port1
mac, ipv6, ip, tcp
uninitialized
port3-to-port2
mac, ipv6, ip, raw
uninitialized
6 items (6 selected)


admin@00:50:00:02:01:09 (TRAFFIC_GENERATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: no
Quick Start
Test ID: 0
Stream:
Port:
Interface:
Packet Size:
PPS:
MBPS: 20
Tx Template
port1-to-port2
port1-to-port3
port2-to-port1
port2-to-port3
port3-to-port1
port3-to-port2
Start
Stop
Close
New Window
Seq ID Tx Packets Tx Rate Rx Packets Rx Rate Lost Packets Lost Rate Lat. Min. Lat. A... Lat. M... Jitter
1 1 1 643 19.9 Mbps 1 643 19.9 Mbps 0 0 bps 253us 1.65ms 18.5ms 18.3ms
1 2 1 643 19.9 Mbps 1 643 19.9 Mbps 0 0 bps 246us 1.65ms 18.6ms 18.3ms
1 3 1 643 19.9 Mbps 1 643 19.9 Mbps 0 0 bps 214us 1.85ms 27.4ms 27.2ms
1 4 1 643 19.9 Mbps 1 643 19.9 Mbps 0 0 bps 308us 1.91ms 28.2ms 27.9ms
1 5 1 643 19.9 Mbps 1 643 19.9 Mbps 0 0 bps 281us 1.91ms 20ms 19.7ms
1 TOT 9 858 119.4 Mbps 9 858 119.4 Mbps 0 0 bps 214us 1.76ms 28.2ms 28ms
2 0 1 652 20.0 Mbps 1 652 20.0 Mbps 0 0 bps 306us 1.1ms 4.38ms 4.07ms
2 1 1 652 20.0 Mbps 1 652 20.0 Mbps 0 0 bps 258us 1.14ms 4.18ms 3.92ms
2 2 1 652 20.0 Mbps 1 652 20.0 Mbps 0 0 bps 262us 1.14ms 4.24ms 3.98ms
2 3 1 652 20.0 Mbps 1 652 20.0 Mbps 0 0 bps 213us 1.22ms 4.95ms 4.74ms
2 4 1 652 20.0 Mbps 1 652 20.0 Mbps 0 0 bps 283us 1.26ms 4.67ms 4.39ms
2 5 1 652 20.0 Mbps 1 652 20.0 Mbps 0 0 bps 337us 1.28ms 4.53ms 4.19ms
2 TOT 9 912 120.0 Mbps 9 912 120.0 Mbps 0 0 bps 213us 1.19ms 4.95ms 4.74ms
TOT 0 3 295 19.9 Mbps 3 295 19.9 Mbps 0 0 bps 306us 1.34ms 18.2ms 17.9ms
20 items


admin@192.168.111.12 (DUT) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 192.168.111.12
Memory: 988.5 MiB CPU: 74%
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
IPv6
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Interface List
Interface
Interface List
Ethernet
EoIP Tunnel
IP Tunnel
GRE Tunnel
VLAN
VRRP
Bonding
LTE
Find
Name
Type
Actual MTU
L2 MTU
Tx
Rx
R ether1 Ethernet 1500 40.0 Mbps 40.0 Mbps
R ether2 Ethernet 1500 40.0 Mbps 40.0 Mbps
R ether3 Ethernet 1500 40.0 Mbps 40.0 Mbps
R ether4 Ethernet 1500 0 bps 0 bps
R ether5 Ethernet 1500 0 bps 0 bps
R ether6 Ethernet 1500 0 bps 0 bps
R ether7 Ethernet 1500 0 bps 0 bps
R ether8 Ethernet 1500 0 bps 0 bps
R ether9 Ethernet 1500 0 bps 0 bps
R ether10-Mana... Ethernet 1500 74.3 kbps 3.2 kbps
10 items (3 selected)

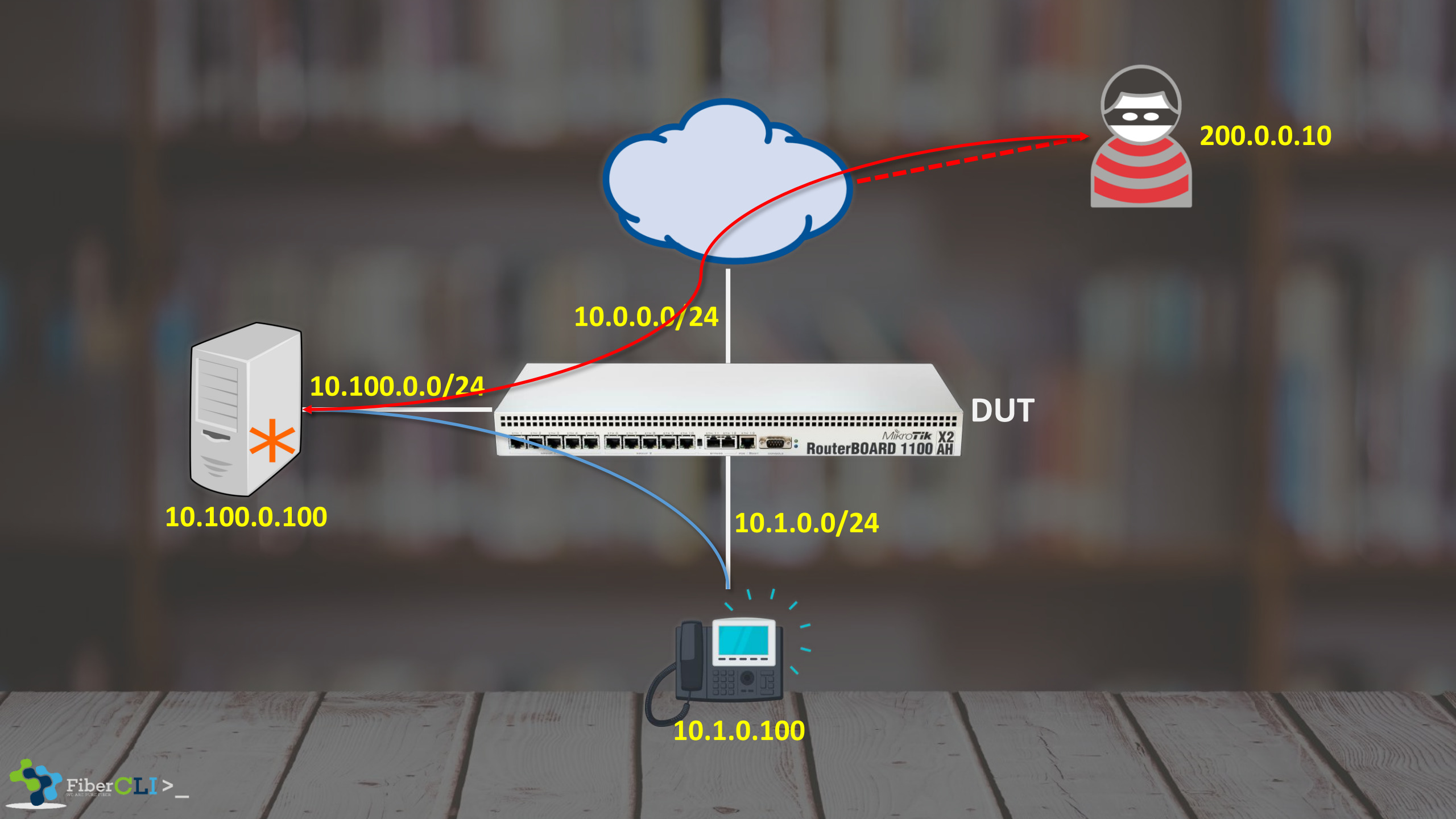

admin@192.168.111.12 (DUT) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 192.168.111.12
Memory: 988.5 MiB CPU: 60%
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
IPv6
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
Interface <ether1>
Interface <ether2>
Interface <ether3>
General Ethernet Loop Protect Status Traffic
Tx/Rx Rate: 40.2 Mbps / 40.2 Mbps
Tx/Rx Packet Rate: 3 322 p/s / 3 322 p/s
FP Tx/Rx Rate: 0 bps / 0 bps
FP Tx/Rx Packet Rate: 0 p/s / 0 p/s
Tx/Rx Bytes: 1187.1 MiB / 1062.5 MiB
Tx/Rx Packets: 822 504 / 736 190
Tx/Rx Drops: 0 / 420
Tx/Rx Errors: 0 / 0
Tx/Rx Bytes: 1160.1 MiB / 1370.4 MiB
Tx/Rx Packets: 803 832 / 949 451
Tx/Rx Drops: 0 / 460
Tx/Rx Errors: 0 / 0
Tx/Rx Bytes: 1265.1 MiB / 1364.4 MiB
Tx/Rx Packets: 876 519 / 945 310
Tx/Rx Drops: 0 / 453
Tx/Rx Errors: 0 / 0
Tx: 40.2 Mbps
Rx: 40.2 Mbps
Tx Packet: 3 322 p/s
Rx Packet: 3 322 p/s
OK
Cancel
Apply
Disable
Comment
Torch
Cable Test
Blink
Reset MAC Address
enabled running slave
enabled running slave
enabled running slave link ok


Torch (Running)
Basic
Interface: ether2
Entry Timeout: 00:00:03 s
Collect
Src. Address
Dst. Address
MAC Protocol
Protocol
DSCP
Src. Address6
Dst. Address6
Port
VLAN Id
Filters
Src. Address: 0.0.0.0/0
Dst. Address: 0.0.0.0/0
Src. Address6: ::/0
Dst. Address6: ::/0
MAC Protocol: all
Protocol: any
Port: any
VLAN Id: any
DSCP: any
Start
Stop
Close
New Window
Eth. Proto... Protocol Src. Dst. VLAN Id DSCP Tx Rate Rx Rate Tx Pack... Rx Pack..
800 (ip) 47 10.2.0.1 10.1.0.1 19.9 Mbps 19.9 Mbps 1644 1644
86dd (ipv6) 47 2001:10:2::1 2001:10:3::1 19.9 Mbps 19.9 Mbps 1644 1644
86dd (ipv6) 58 fe80::250:ff:fe02:101 ff02::1 48 0 bps 0 bps 0 0
3 items
Total Tx: 39.8 Mbps
Total Rx: 39.8 Mbps
Total Tx Packet: 3 288
Total Rx Packet: 3 288

CASE 3

Fabricated Packets test

In this case we will try a queue tree configuration that prioritizes voice traffic. QoS router has mangle rules and queue tree limitations.


200.0.0.10
10.0.0.0/24
10.100.0.0/24
DUT
MikroTik X2
RouterBOARD 1100 AH
10.100.0.100
10.1.0.0/24
10.1.0.100

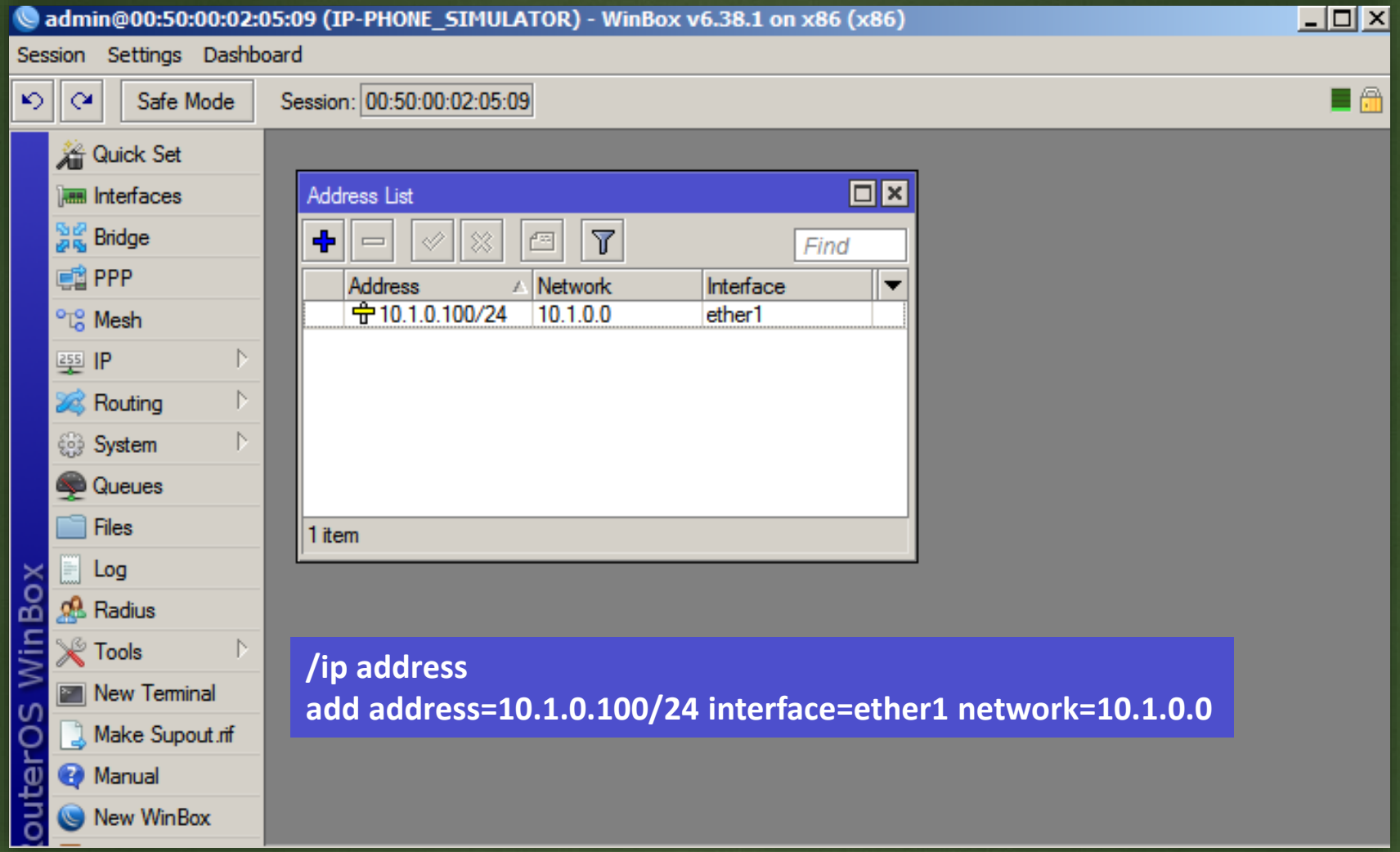
FiberCLI >_

SCENARIO

In this secenario we will generates three diferent packets

- Two packets generated by (IP-PHONE_SIMULATOR) specified like RTP and SIP packets.
- One packet generated by (INTRUDER) random packet like spoofing

IP-PHONE_SIMULATOR



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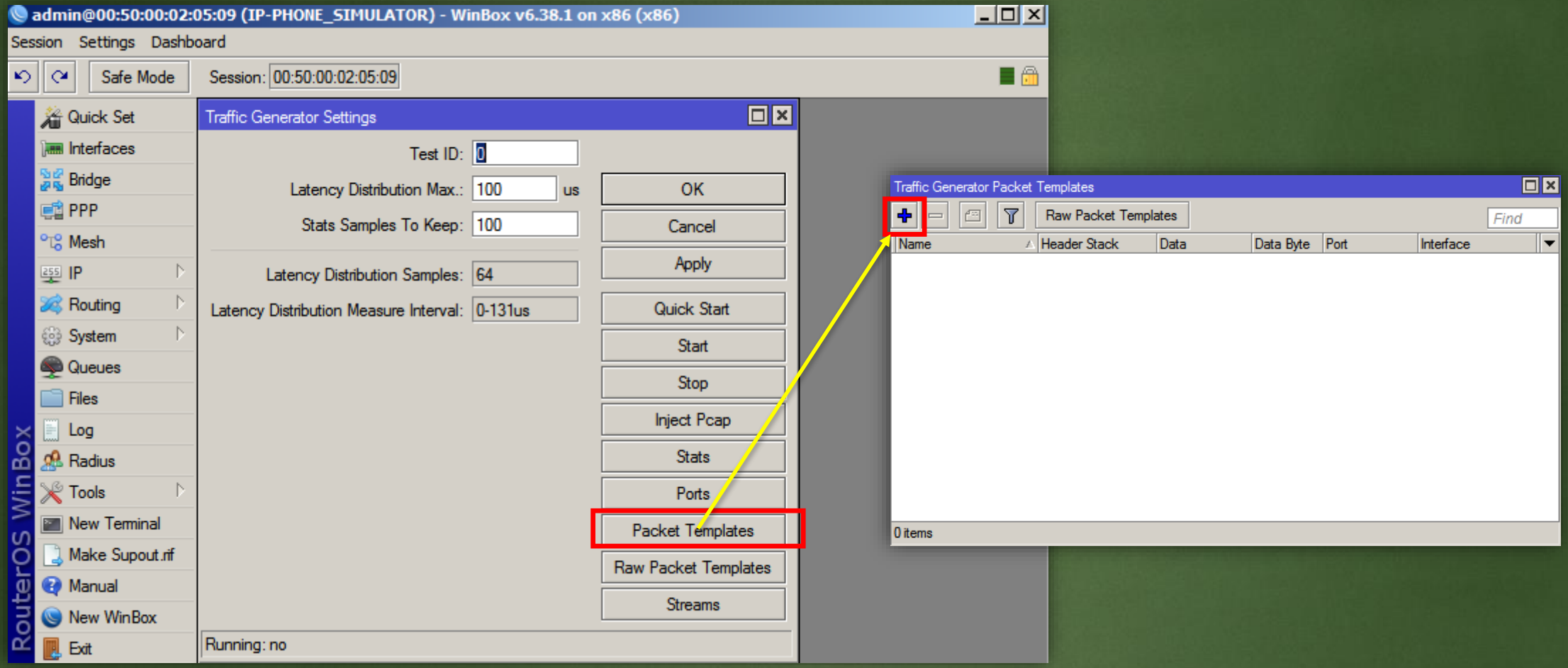
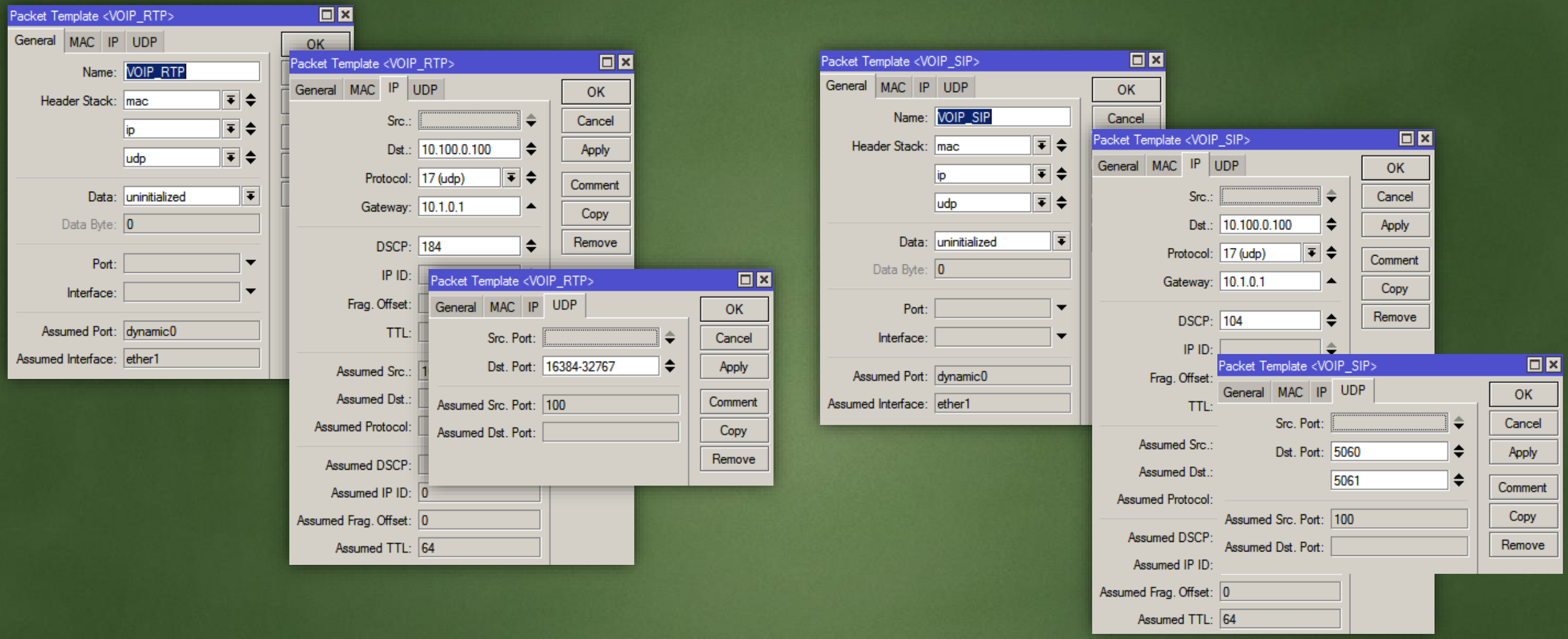
CREATE FABRICATED VOIP TRAFIC

- RTP CALL voice audio data will be marked by DSCP value of 46 DSCP value of 46 results in a ToS byte value of 184 EF=0xB8
- SIP CALL signaling messages will be marked by DSCP value of 26A DSCP value of 26 results in a ToS byte value of 104 AF31=0x68 (=104)75


admin@00:50:00:02:05:09 (IP-PHONE_SIMULATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:05:09
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: no
Traffic Generator Packet Templates
Raw Packet Templates
Find
Name
Header Stack
Data
Data Byte
Port
Interface
0 items




```
/tool traffic-generator packet-template
add ip-dscp=184 ip-dst=10.100.0.100 ip-gateway=10.1.0.1 ip-protocol=udp name=VOIP_RTP udp-dst-port=16384-32767
add ip-dscp=104 ip-dst=10.100.0.100 ip-gateway=10.1.0.1 ip-protocol=udp name=VOIP_SIP udp-dst-port=5060,5061
```

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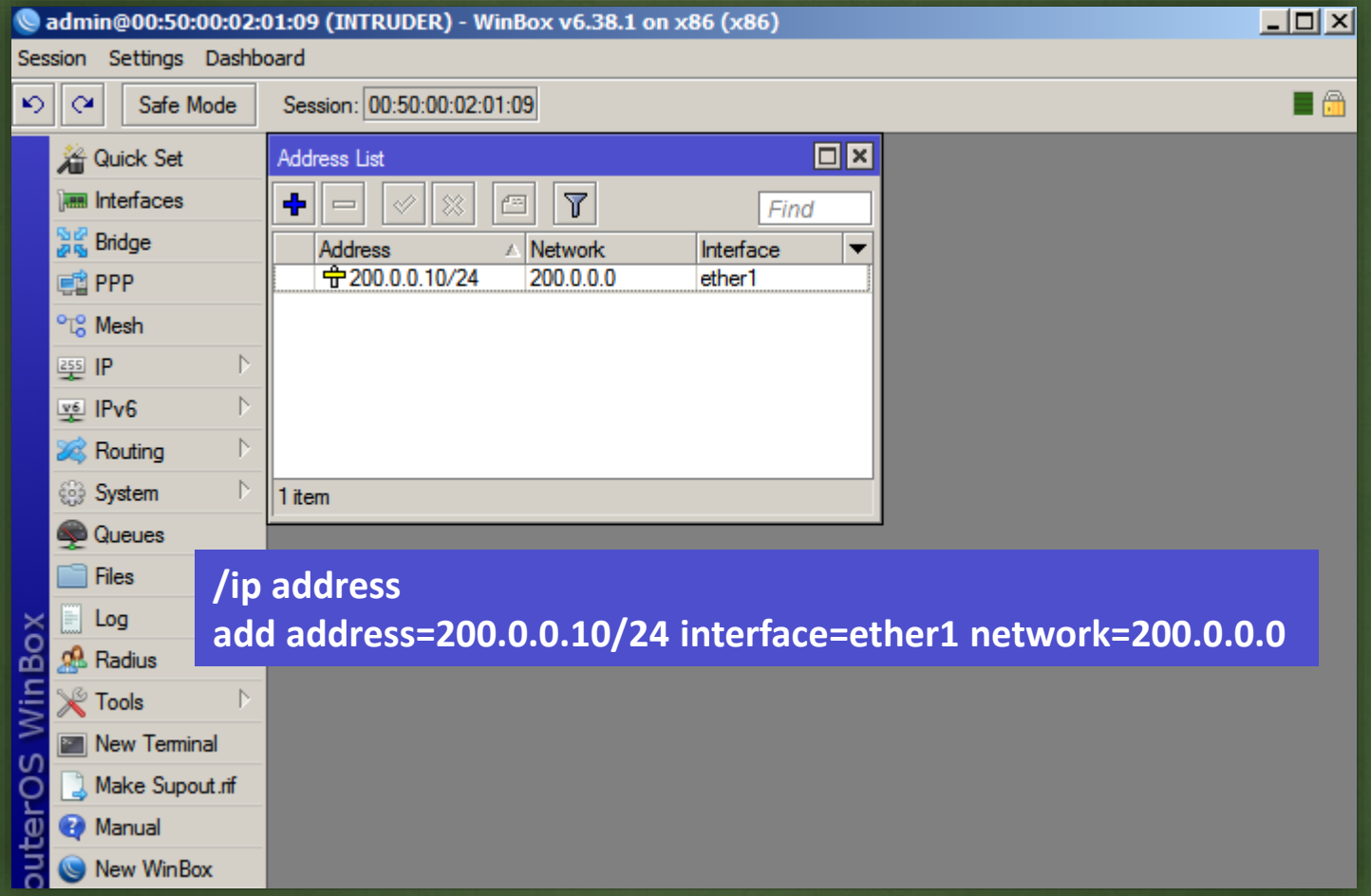
INTRUDER



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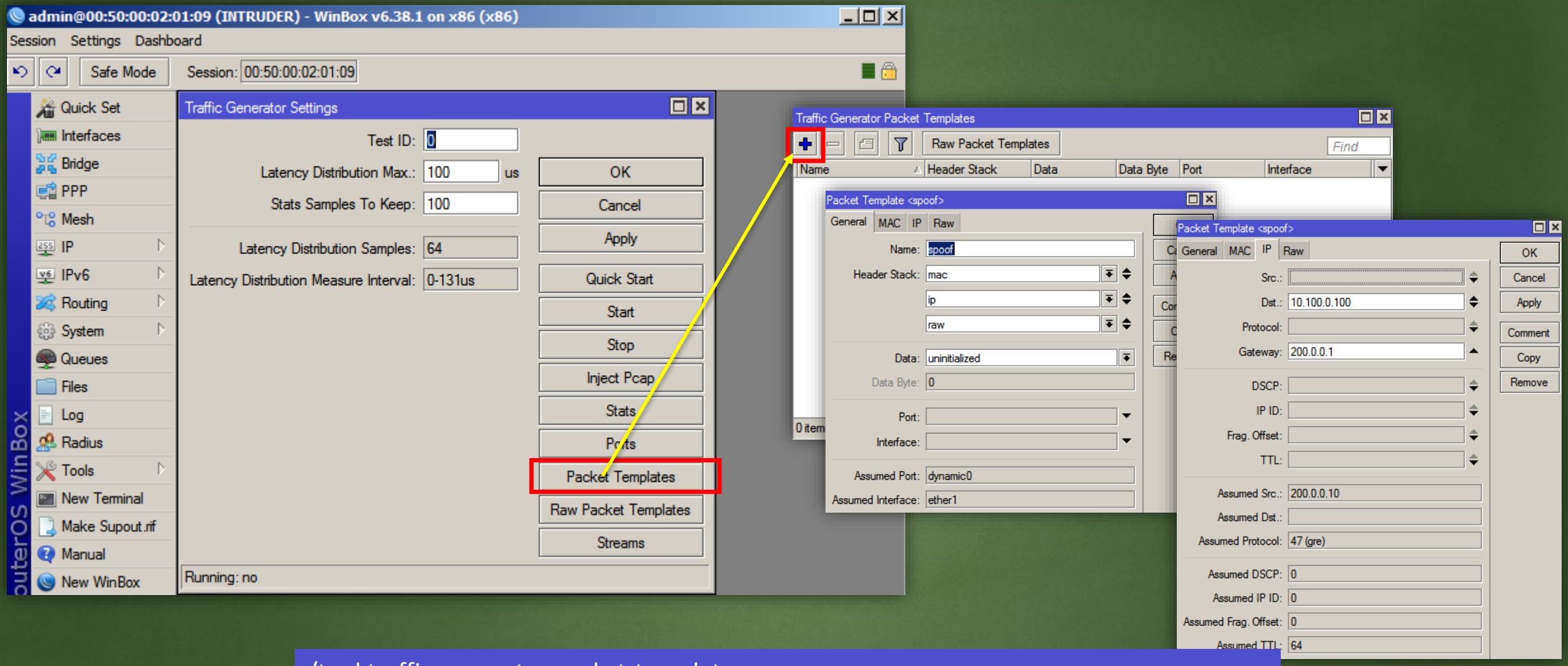
CREATE FABRICATED RANDOM TRAFIC

- Create random RAW packet in Traffic-Generator




```
/tool traffic-generator packet-template
add header-stack=mac,ip,raw ip-dst=10.100.0.100 ip-gateway=200.0.0.1 name=spoof
/tool traffic-generator stream add name=stream-1 packet-size=1500 tx-template=spoof
```

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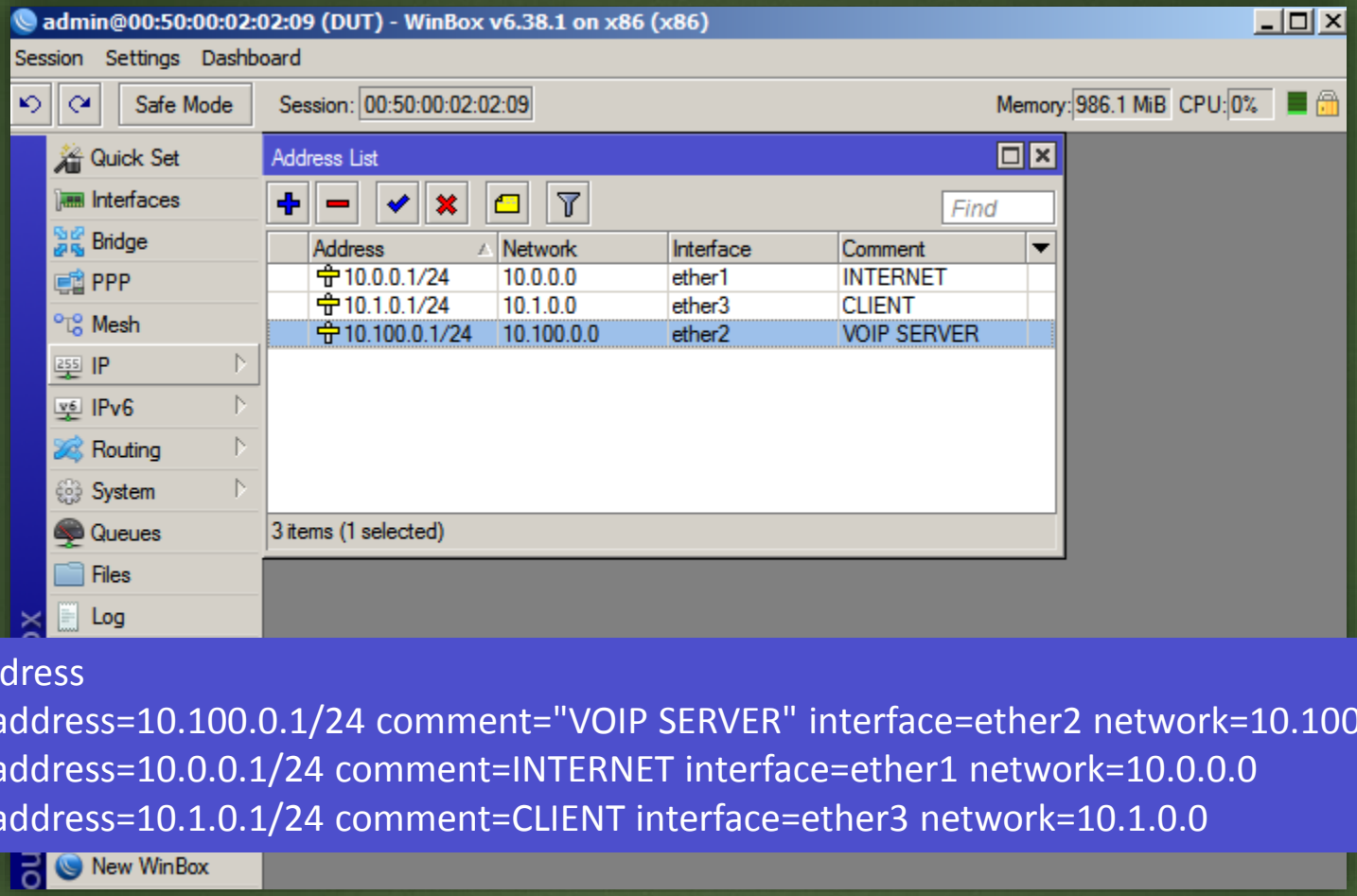
DUT/SUT




```
ip address
add address=10.100.0.1/24 comment="VOIP SERVER" interface=ether2 network=10.100.0.0
add address=10.0.0.1/24 comment=INTERNET interface=ether1 network=10.0.0.0
add address=10.1.0.1/24 comment=CLIENT interface=ether3 network=10.1.0.0
```

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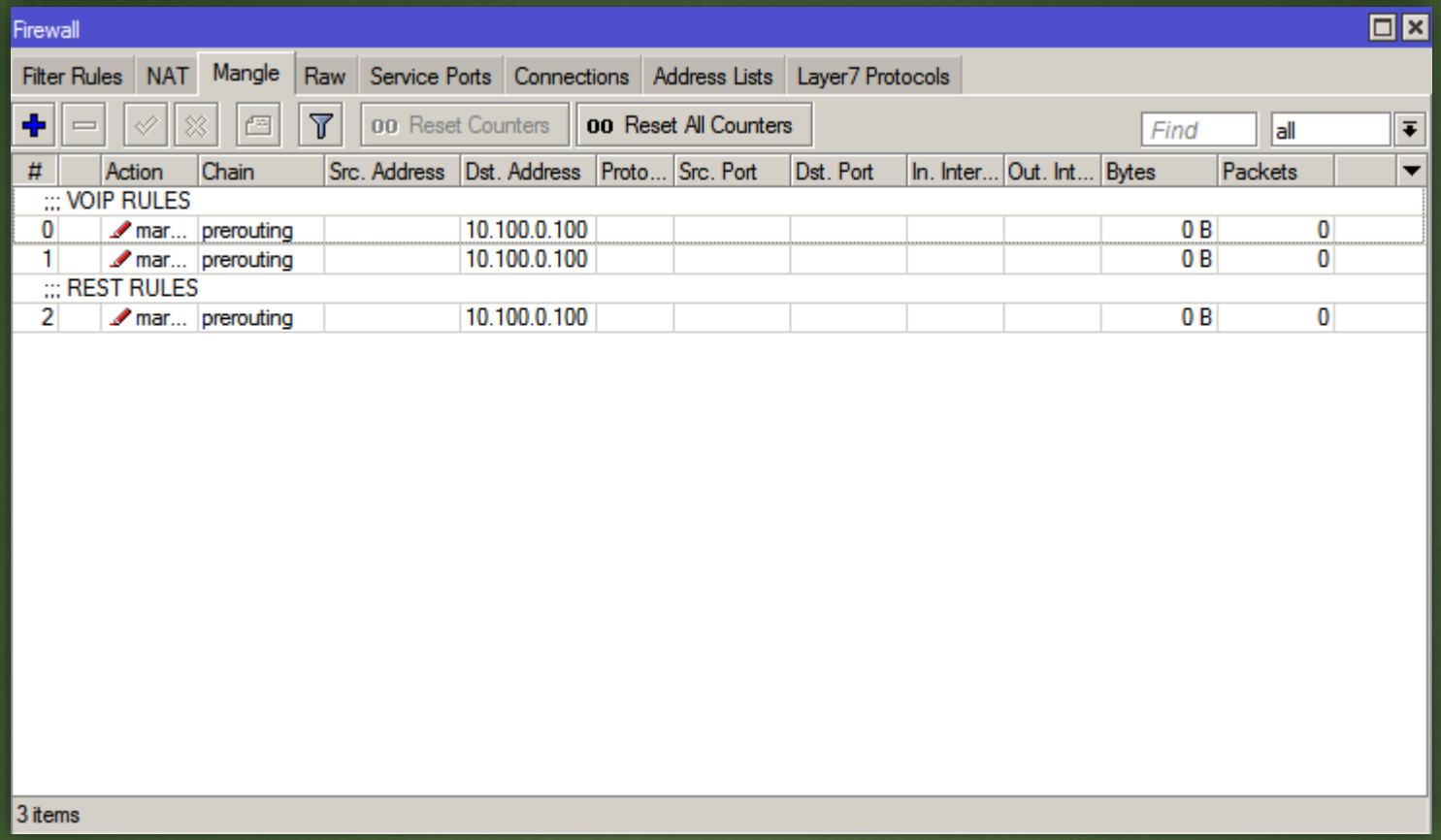
CREATE MANGLE AND QUEUE TREE

- Create two mangle for VOIP and one mangle for rest of packets destinated to VOIP Server
- Create three queue-tree
  - One parent queue (PBX_Traffic)
  - One queue for rest packets (REST)
  - One queue for VOIP packets (VOIP)




```
/ip firewall mangle
add action=mark-packet chain=prerouting comment="VOIP RULES" dscp=46 dst-address=10.100.0.100 new-packet-mark=voip-packets passthrough=no
add action=mark-packet chain=prerouting dscp=26 dst-address=10.100.0.100 new-packet-mark=voip-packets passthrough=no
add action=mark-packet chain=prerouting comment="REST RULES" dst-address=10.100.0.100 new-packet-mark=rest-packets passthrough=no
```

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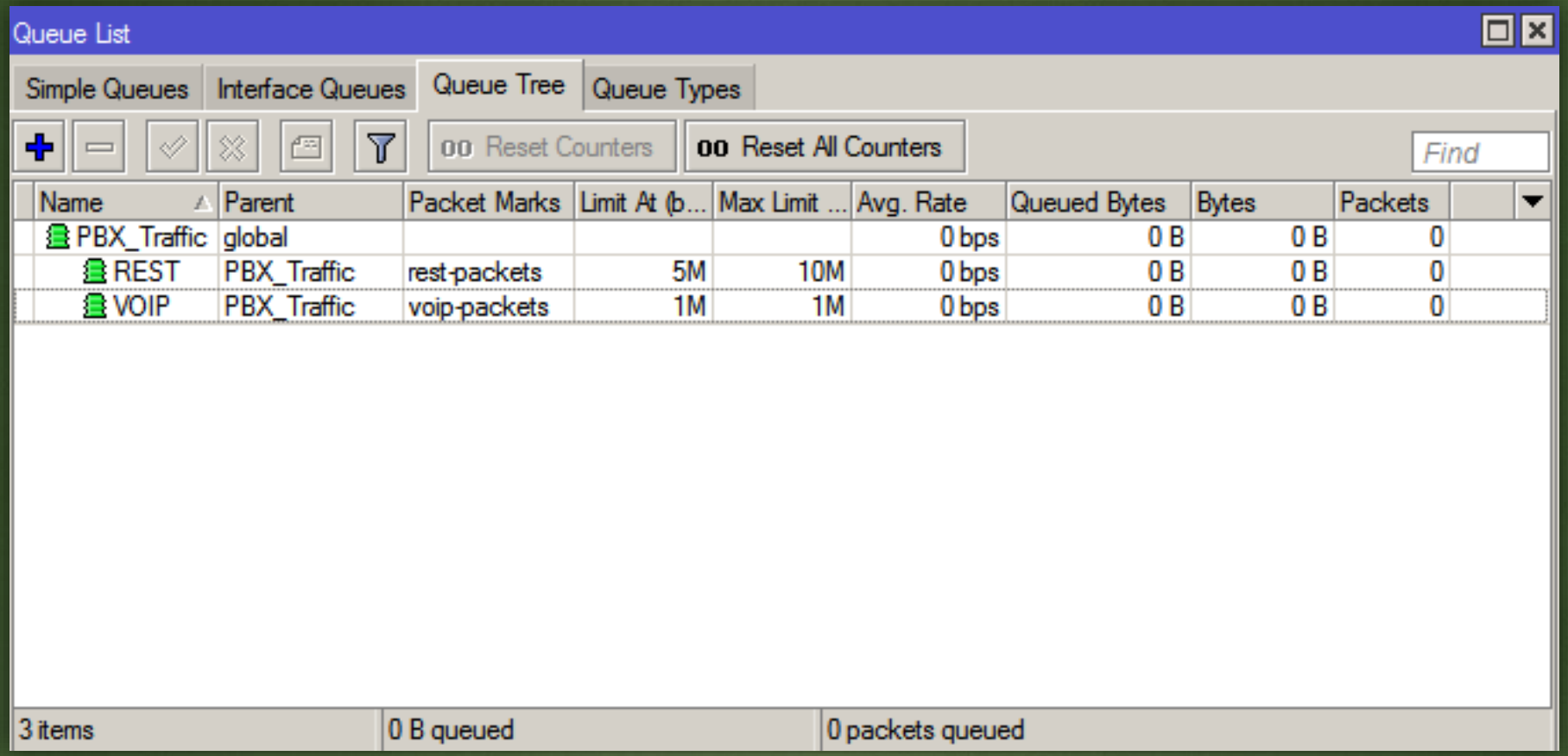
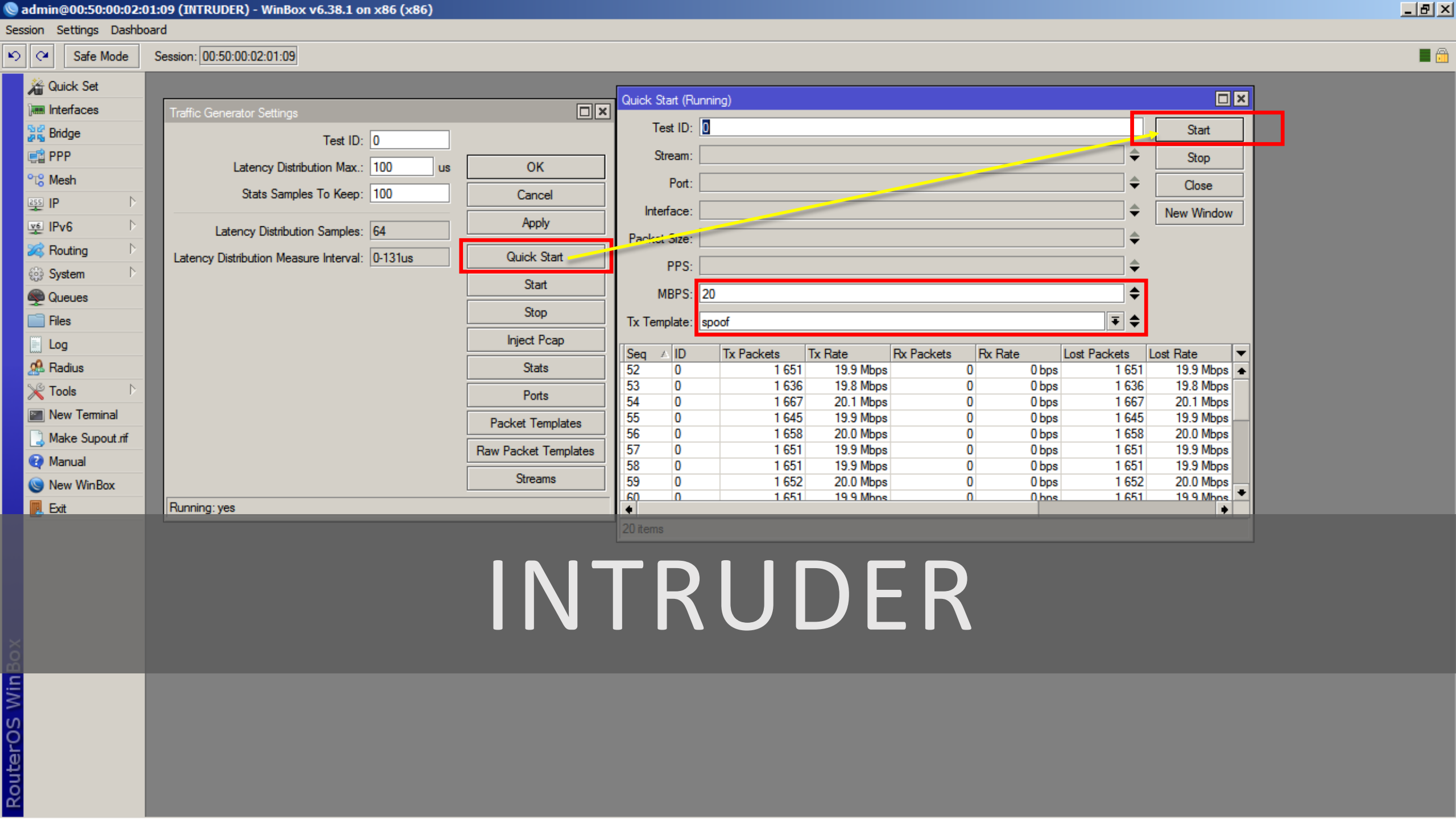


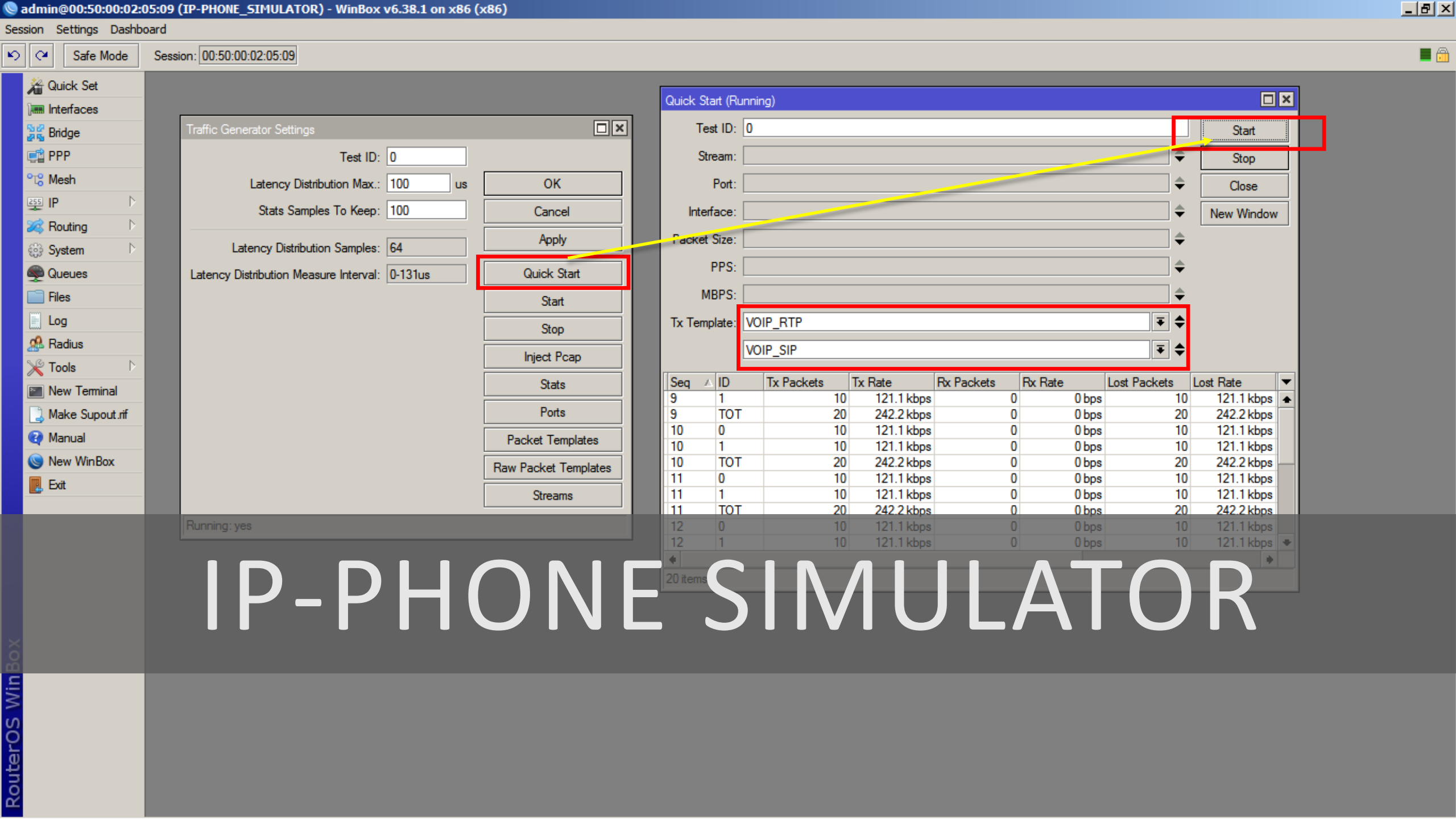

```
/queue tree
add name=PBX_Traffic parent=global
add limit-at=5M max-limit=10M name=REST packet-mark=rest-packets parent=PBX_Traffic
add limit-at=1M max-limit=1M name=VOIP packet-mark=voip-packets parent=PBX_Traffic priority=1
```

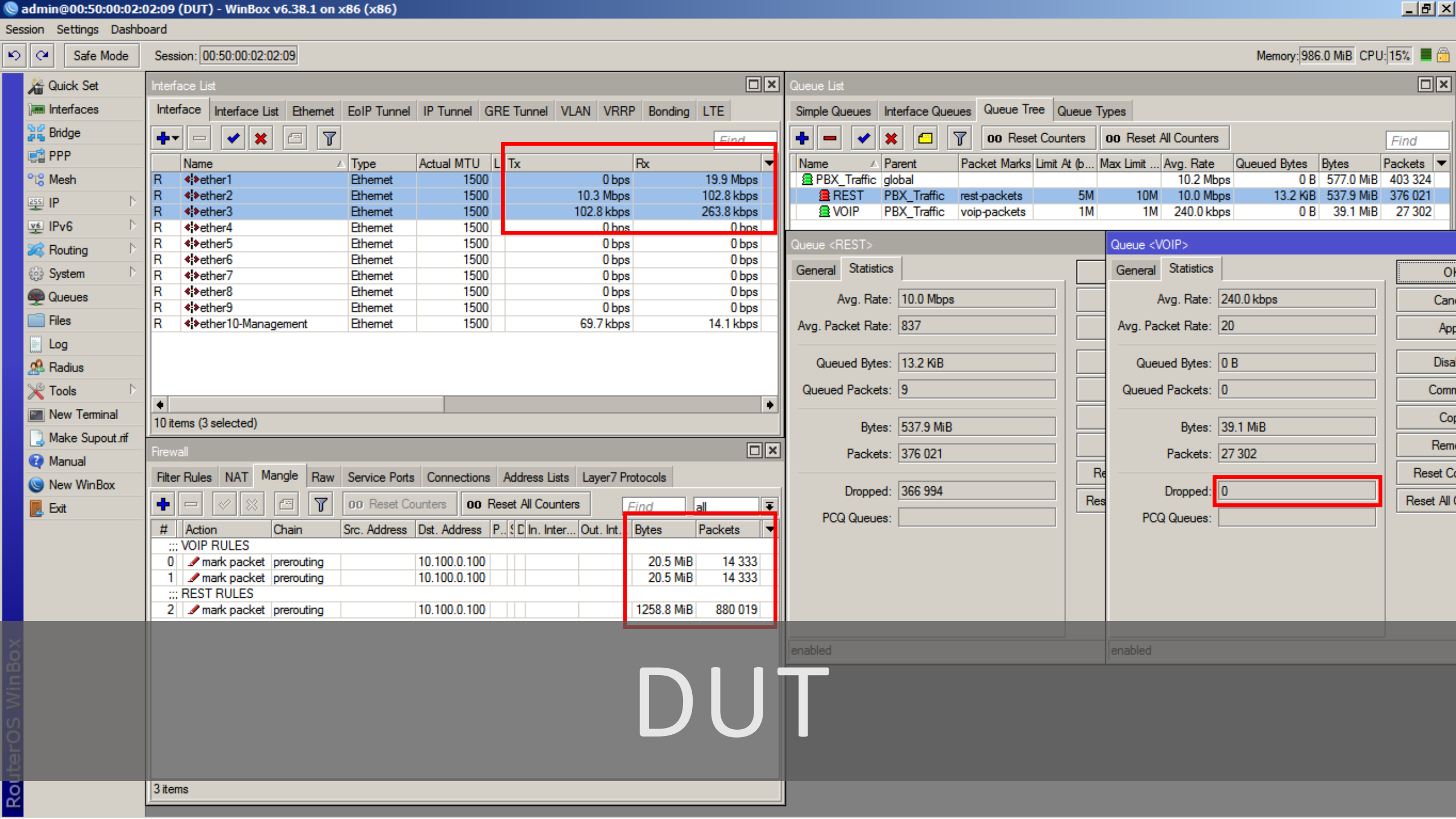
FiberCLI >_

LAUNCH SIMULATION

- Launch traffic-generator from “INTRUDER” with packets 20 mbps
- Launch traffic-generator from “IP-PHONE_SIMULATOR” with 120 kbps traffic

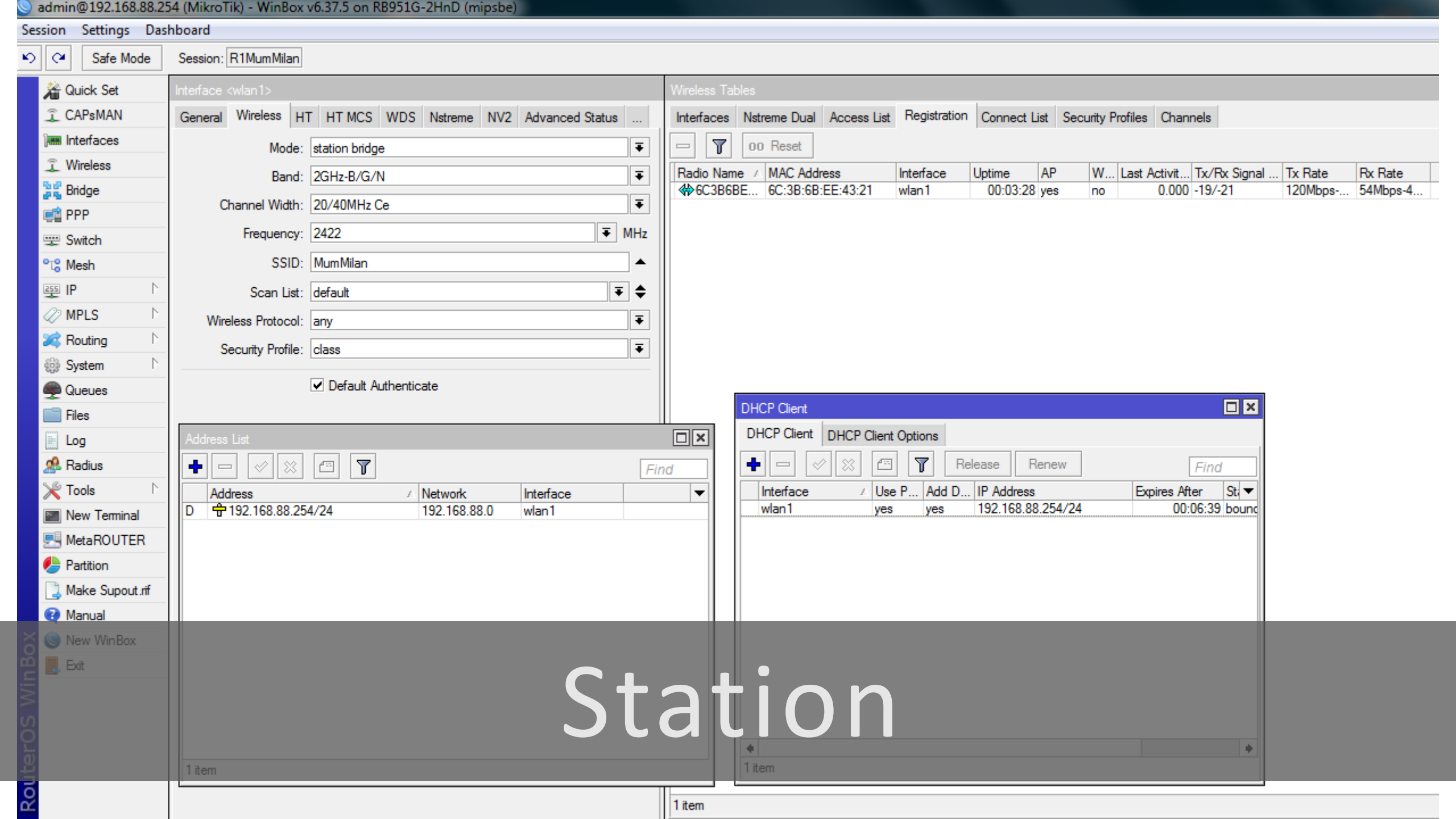

admin@00:50:00:02:01:09 (INTRUDER) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:01:09
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
IPv6
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: yes
Quick Start (Running)
Test ID: 0
Stream:
Port:
Interface:
Packet Size:
PPS:
MBPS: 20
Tx Template: spoof
Start
Stop
Close
New Window
Seq ID Tx Packets Tx Rate Rx Packets Rx Rate Lost Packets Lost Rate
52 0 1 651 19.9 Mbps 0 0 bps 1 651 19.9 Mbps
53 0 1 636 19.8 Mbps 0 0 bps 1 636 19.8 Mbps
54 0 1 667 20.1 Mbps 0 0 bps 1 667 20.1 Mbps
55 0 1 645 19.9 Mbps 0 0 bps 1 645 19.9 Mbps
56 0 1 658 20.0 Mbps 0 0 bps 1 658 20.0 Mbps
57 0 1 651 19.9 Mbps 0 0 bps 1 651 19.9 Mbps
58 0 1 651 19.9 Mbps 0 0 bps 1 651 19.9 Mbps
59 0 1 652 20.0 Mbps 0 0 bps 1 652 20.0 Mbps
20 items
INTRUDER
RouterOS WinBox

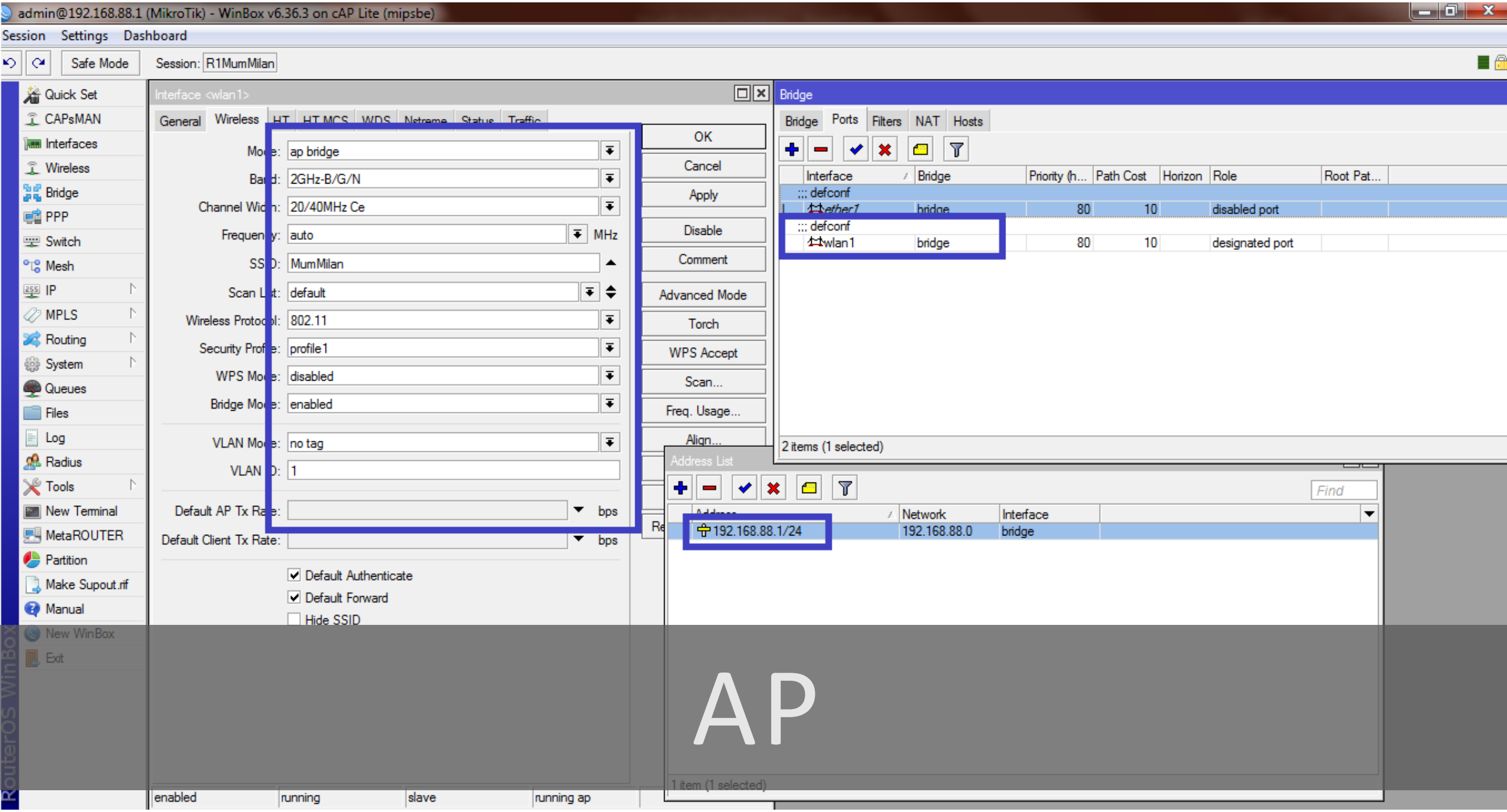

admin@00:50:00:02:05:09 (IP-PHONE_SIMULATOR) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:05:09
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 100 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-131us
OK
Cancel
Apply
Quick Start
Start
Stop
Inject Pcap
Stats
Ports
Packet Templates
Raw Packet Templates
Streams
Running: yes
Quick Start (Running)
Test ID: 0
Stream:
Port:
Interface:
Packet Size:
PPS:
MBPS:
Tx Template: VOIP_RTP
VOIP_SIP
Start
Stop
Close
New Window
Seq ID Tx Packets Tx Rate Rx Packets Rx Rate Lost Packets Lost Rate
9 1 10 121.1 kbps 0 0 bps 10 121.1 kbps
9 TOT 20 242.2 kbps 0 0 bps 20 242.2 kbps
10 0 10 121.1 kbps 0 0 bps 10 121.1 kbps
10 1 10 121.1 kbps 0 0 bps 10 121.1 kbps
10 TOT 20 242.2 kbps 0 0 bps 20 242.2 kbps
11 0 10 121.1 kbps 0 0 bps 10 121.1 kbps
11 1 10 121.1 kbps 0 0 bps 10 121.1 kbps
11 TOT 20 242.2 kbps 0 0 bps 20 242.2 kbps
12 0 10 121.1 kbps 0 0 bps 10 121.1 kbps
12 1 10 121.1 kbps 0 0 bps 10 121.1 kbps
20 items
IP-PHONE SIMULATOR
RouterOS WinBox

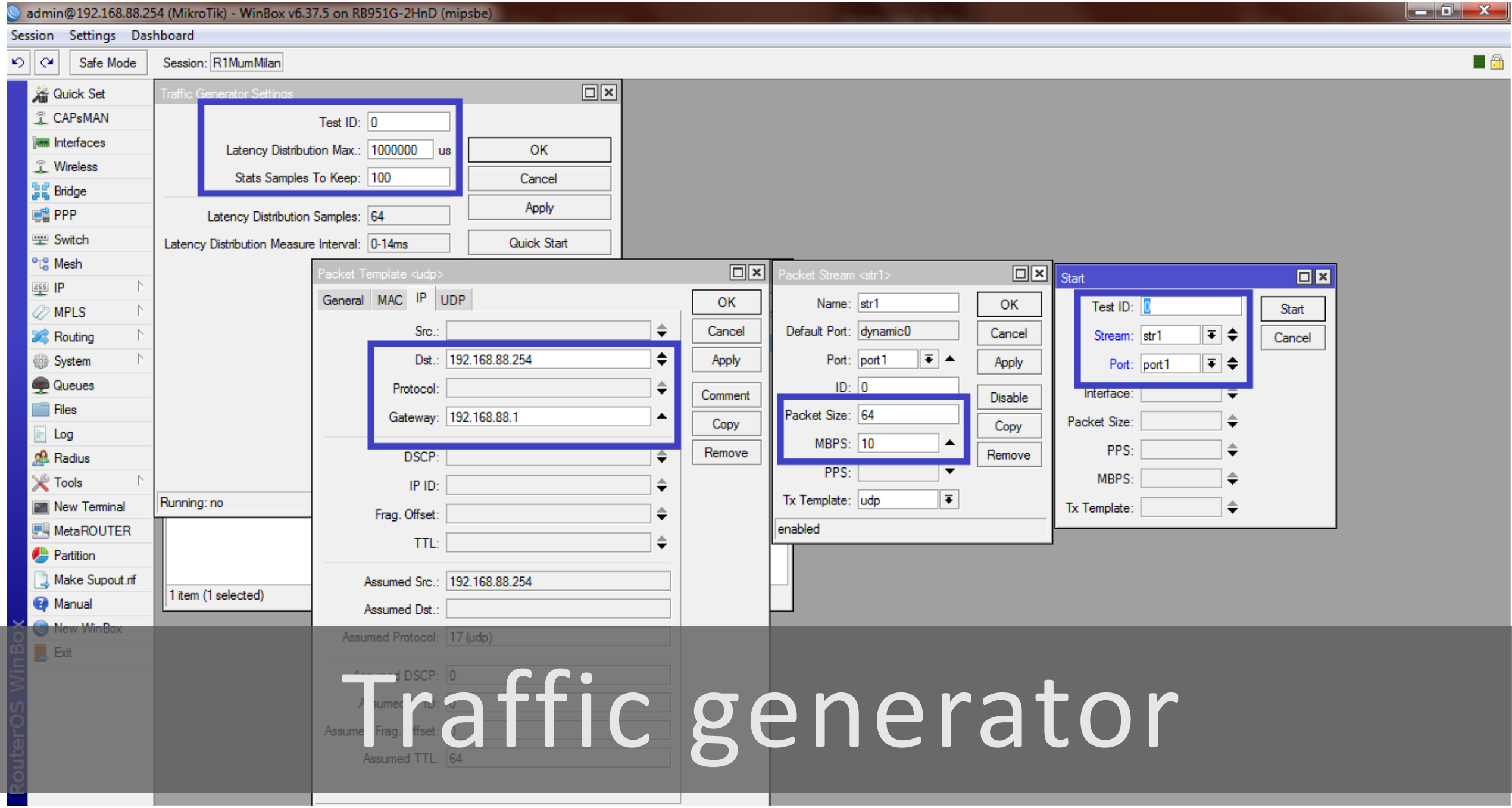

admin@00:50:00:02:02:09 (DUT) - WinBox v6.38.1 on x86 (x86)
Session Settings Dashboard
Safe Mode
Session: 00:50:00:02:02:09
Memory: 986.0 MiB CPU: 15%
Quick Set
Interfaces
Bridge
PPP
Mesh
IP
IPv6
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
New WinBox
Exit
Interface List
Interface Interface List Ethernet EoIP Tunnel IP Tunnel GRE Tunnel VLAN VRRP Bonding LTE
Name Type Actual MTU L Tx Rx
R ether1 Ethernet 1500 0 bps 19.9 Mbps
R ether2 Ethernet 1500 10.3 Mbps 102.8 kbps
R ether3 Ethernet 1500 102.8 kbps 263.8 kbps
R ether4 Ethernet 1500 0 bps 0 bps
R ether5 Ethernet 1500 0 bps 0 bps
R ether6 Ethernet 1500 0 bps 0 bps
R ether7 Ethernet 1500 0 bps 0 bps
R ether8 Ethernet 1500 0 bps 0 bps
R ether9 Ethernet 1500 0 bps 0 bps
R ether10-Management Ethernet 1500 69.7 kbps 14.1 kbps
10 items (3 selected)
Firewall
Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols
Reset Counters Reset All Counters
Action Chain Src. Address Dst. Address P... In. Inter... Out. Int... Bytes Packets
;;; VOIP RULES
0 mark packet prerouting 10.100.0.100 20.5 MiB 14 333
1 mark packet prerouting 10.100.0.100 20.5 MiB 14 333
;;; REST RULES
2 mark packet prerouting 10.100.0.100 1258.8 MiB 880 019
3 items
Queue List
Simple Queues Interface Queues Queue Tree Queue Types
Reset Counters Reset All Counters
Name Parent Packet Marks Limit At (b... Max Limit ... Avg. Rate Queued Bytes Bytes Packets
PBX_Traffic global 10.2 Mbps 0 B 577.0 MiB 403 324
REST PBX_Traffic rest-packets 5M 10M 10.0 Mbps 13.2 KiB 537.9 MiB 376 021
VOIP PBX_Traffic voip-packets 1M 1M 240.0 kbps 0 B 39.1 MiB 27 302
Queue <REST>
General Statistics
Avg. Rate: 10.0 Mbps
Avg. Packet Rate: 837
Queued Bytes: 13.2 KiB
Queued Packets: 9
Bytes: 537.9 MiB
Packets: 376 021
Dropped: 366 994
PCQ Queues:
enabled
Queue <VOIP>
General Statistics
Avg. Rate: 240.0 kbps
Avg. Packet Rate: 20
Queued Bytes: 0 B
Queued Packets: 0
Bytes: 39.1 MiB
Packets: 27 302
Dropped: 0
PCQ Queues:
enabled
DUT
RouterOS WinBox

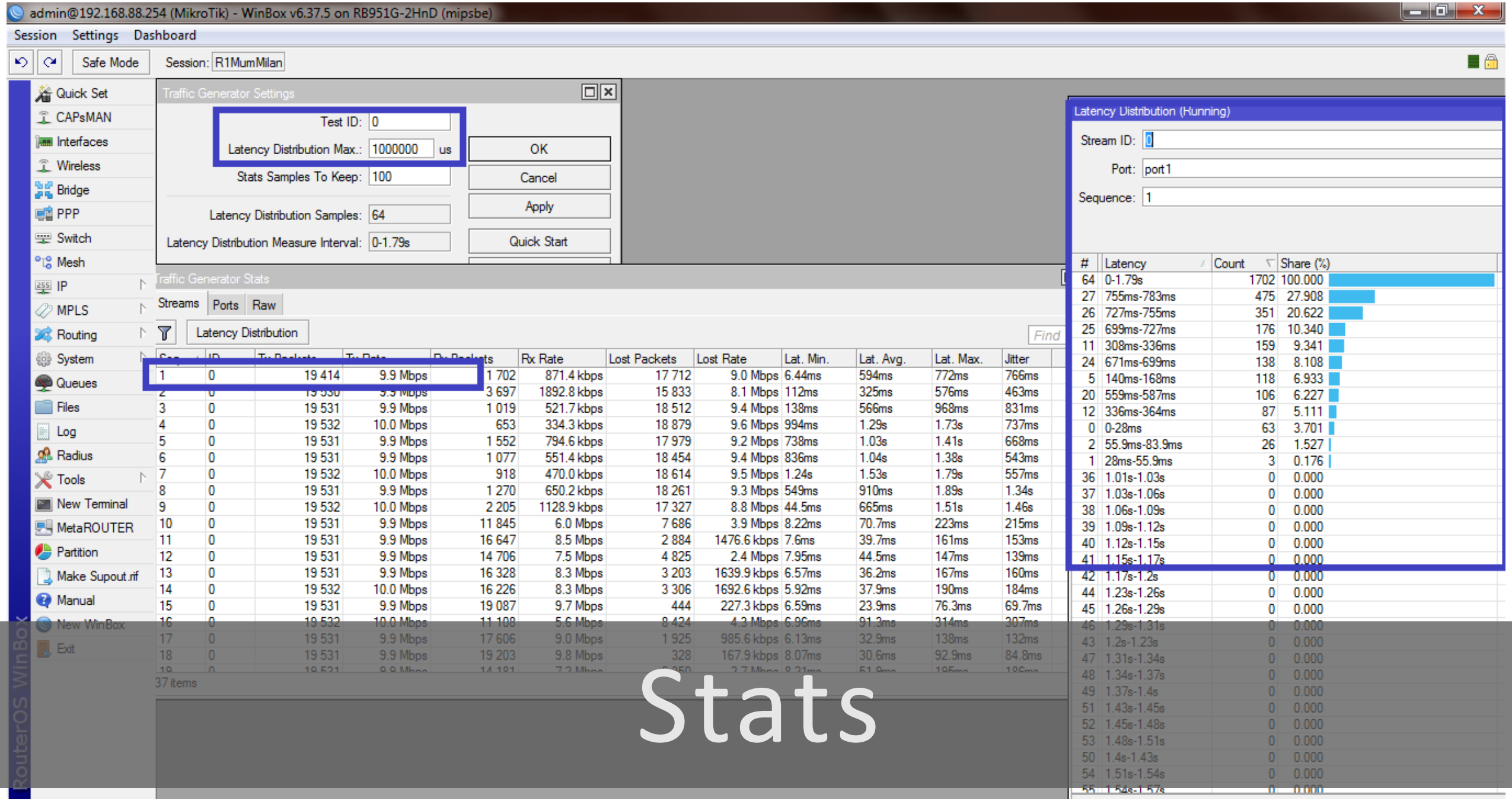
CASE 4

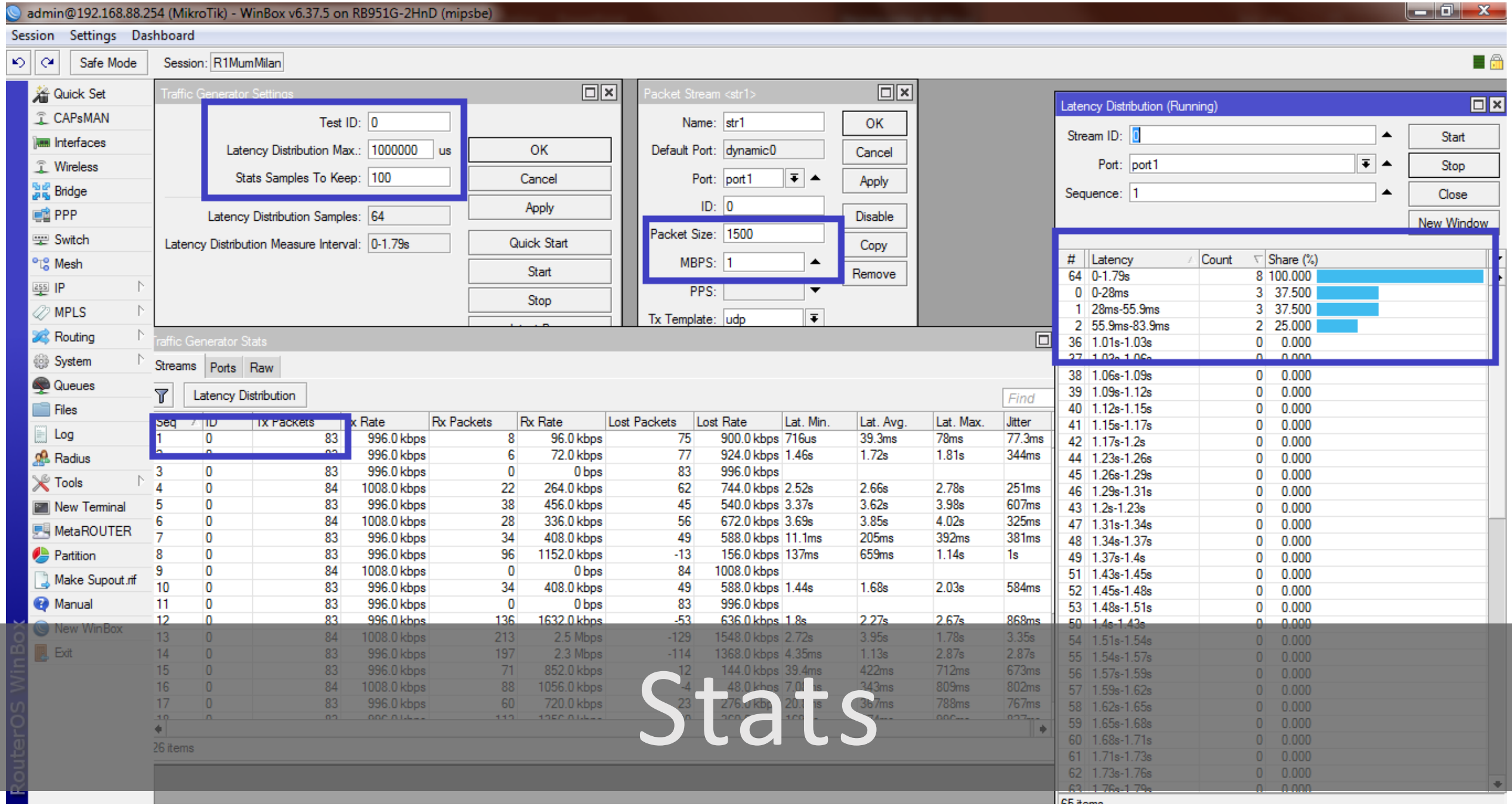
Testing wireless


admin@192.168.88.254 (MikroTik) - WinBox v6.37.5 on RB951G-2HnD (mipsbe)
Session Settings Dashboard
Safe Mode
Session: R1MumMilan
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Interface <wlan1>
General Wireless HT HT MCS WDS Nstreme NV2 Advanced Status ...
Mode: station bridge
Band: 2GHz-B/G/N
Channel Width: 20/40MHz Ce
Frequency: 2422 MHz
SSID: MumMilan
Scan List: default
Wireless Protocol: any
Security Profile: class
Default Authenticate
Wireless Tables
Interfaces Nstreme Dual Access List Registration Connect List Security Profiles Channels
Reset
Radio Name MAC Address Interface Uptime AP W... Last Activit... Tx/Rx Signal ... Tx Rate Rx Rate
6C3B6BE... 6C:3B:6B:EE:43:21 wlan1 00:03:28 yes no 0.000 -19/-21 120Mbps-... 54Mbps-4...
Address List
Find
Address Network Interface
D 192.168.88.254/24 192.168.88.0 wlan1
1 item
DHCP Client
DHCP Client DHCP Client Options
Release Renew
Find
Interface Use P... Add D... IP Address Expires After St
wlan1 yes yes 192.168.88.254/24 00:06:39 bound
1 item
1 item
Station


admin@192.168.88.1 (MikroTik) - WinBox v6.36.3 on cAP Lite (mipsbe)
Session Settings Dashboard
Safe Mode
Session: R1MumMilan
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
Exit
Interface <wlan1>
General
Wireless
HT
HT MCS
WDS
Nstreme
Status
Traffic
Mode: ap bridge
Band: 2GHz-B/G/N
Channel Width: 20/40MHz Ce
Frequency: auto
MHz
SSID: MumMilan
Scan List: default
Wireless Protocol: 802.11
Security Profile: profile1
WPS Mode: disabled
Bridge Mode: enabled
VLAN Mode: no tag
VLAN ID: 1
Default AP Tx Rate:
bps
Default Client Tx Rate:
bps
Default Authenticate
Default Forward
Hide SSID
OK
Cancel
Apply
Disable
Comment
Advanced Mode
Torch
WPS Accept
Scan...
Freq. Usage...
Align...
Bridge
Bridge
Ports
Filters
NAT
Hosts
Interface
Bridge
Priority (h...
Path Cost
Horizon
Role
Root Pat...
;;; defconf
ether1
bridge
80
10
disabled port
;;; defconf
wlan1
bridge
80
10
designated port
2 items (1 selected)
Address List
Find
Address
Network
Interface
192.168.88.1/24
192.168.88.0
bridge
1 item (1 selected)
enabled
running
slave
running ap
RouterOS WinBox
AP


admin@192.168.88.254 (MikroTik) - WinBox v6.37.5 on RB951G-2HnD (mipsbe)
Session Settings Dashboard
Safe Mode
Session: R1MumMilan
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 1000000 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-14ms
OK
Cancel
Apply
Quick Start
Running: no
1 item (1 selected)
Packet Template <udp>
General MAC IP UDP
Src.:
Dst.: 192.168.88.254
Protocol:
Gateway: 192.168.88.1
DSCP:
IP ID:
Frag. Offset:
TTL:
Assumed Src.: 192.168.88.254
Assumed Dst.:
Assumed Protocol: 17 (udp)
Assumed DSCP: 0
Assumed TTL: 64
OK
Cancel
Apply
Comment
Copy
Remove
Packet Stream <str1>
Name: str1
Default Port: dynamic0
Port: port1
ID: 0
Packet Size: 64
MBPS: 10
PPS:
Tx Template: udp
enabled
OK
Cancel
Apply
Disable
Copy
Remove
Start
Test ID: 0
Stream: str1
Port: port1
Interface:
Packet Size:
PPS:
MBPS:
Tx Template:
Start
Cancel
Traffic generator


admin@192.168.88.254 (MikroTik) - WinBox v6.37.5 on RB951G-2HnD (mipsbe)
Session Settings Dashboard
Safe Mode
Session: R1MumMilan
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 1000000 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-1.79s
OK
Cancel
Apply
Quick Start
Traffic Generator Stats
Streams Ports Raw
Latency Distribution
Find
Latency Distribution (Running)
Stream ID: 0
Port: port1
Sequence: 1
Latency Count Share (%)
64 0-1.79s 1702 100.000
27 755ms-783ms 475 27.908
26 727ms-755ms 351 20.622
25 699ms-727ms 176 10.340
11 308ms-336ms 159 9.341
24 671ms-699ms 138 8.108
5 140ms-168ms 118 6.933
20 559ms-587ms 106 6.227
12 336ms-364ms 87 5.111
0 0-28ms 63 3.701
2 55.9ms-83.9ms 26 1.527
1 28ms-55.9ms 3 0.176
36 1.01s-1.03s 0 0.000
37 1.03s-1.06s 0 0.000
38 1.06s-1.09s 0 0.000
39 1.09s-1.12s 0 0.000
40 1.12s-1.15s 0 0.000
41 1.15s-1.17s 0 0.000
42 1.17s-1.2s 0 0.000
44 1.23s-1.26s 0 0.000
45 1.26s-1.29s 0 0.000
Stats

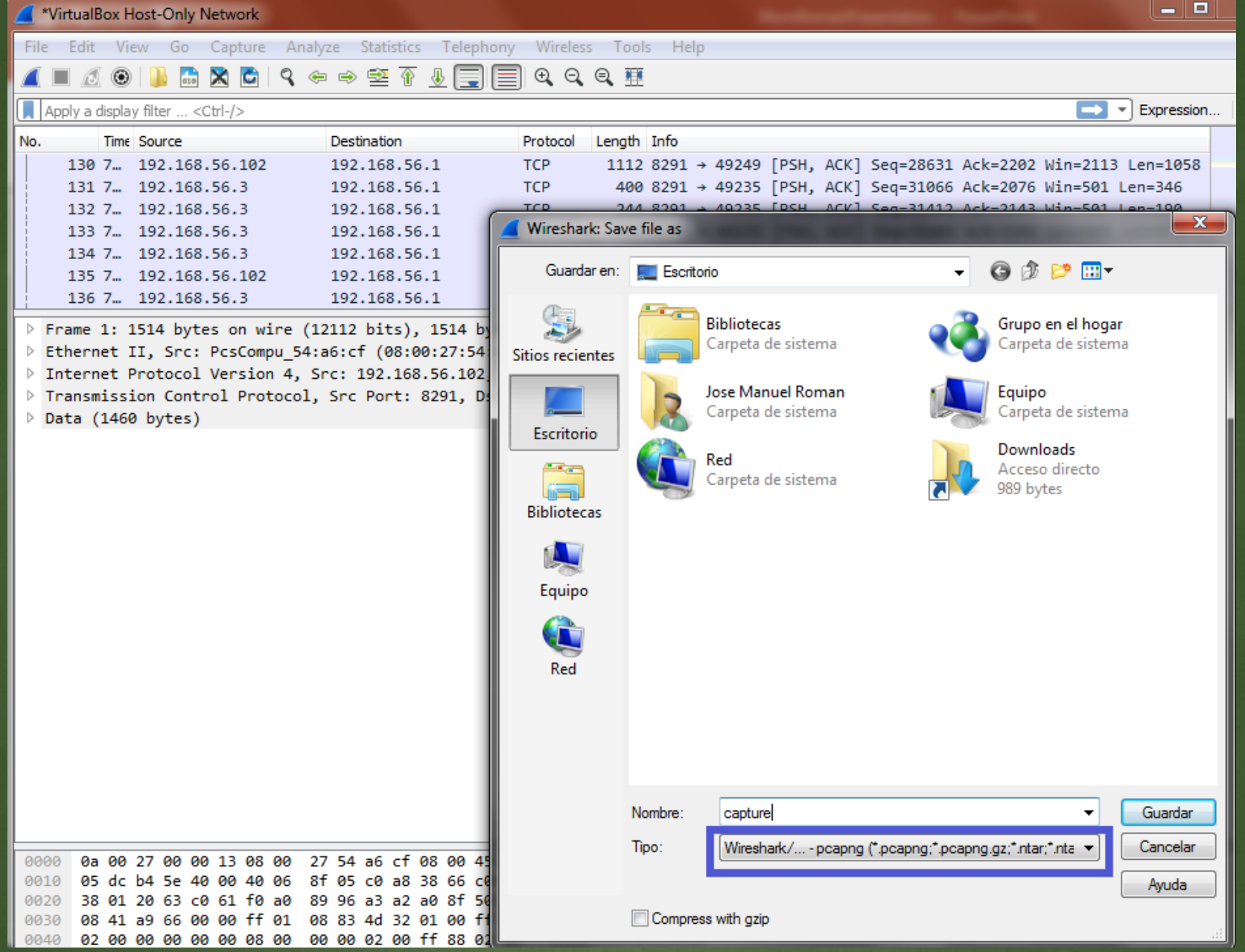

admin@192.168.88.254 (MikroTik) - WinBox v6.37.5 on RB951G-2HnD (mipsbe)
Session Settings Dashboard
Safe Mode
Session: R1MumMilan
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID: 0
Latency Distribution Max.: 1000000 us
Stats Samples To Keep: 100
Latency Distribution Samples: 64
Latency Distribution Measure Interval: 0-1.79s
OK
Cancel
Apply
Quick Start
Start
Stop
Packet Stream <str1>
Name: str1
Default Port: dynamic0
Port: port1
ID: 0
Packet Size: 1500
MBPS: 1
PPS:
Tx Template: udp
OK
Cancel
Apply
Disable
Copy
Remove
Latency Distribution (Running)
Stream ID: 0
Port: port1
Sequence: 1
Start
Stop
Close
New Window
Latency Count Share (%)
64 0-1.79s 8 100.000
0 0-28ms 3 37.500
1 28ms-55.9ms 3 37.500
2 55.9ms-83.9ms 2 25.000
36 1.01s-1.03s 0 0.000
38 1.06s-1.09s 0 0.000
39 1.09s-1.12s 0 0.000
40 1.12s-1.15s 0 0.000
41 1.15s-1.17s 0 0.000
42 1.17s-1.2s 0 0.000
44 1.23s-1.26s 0 0.000
45 1.26s-1.29s 0 0.000
46 1.29s-1.31s 0 0.000
43 1.2s-1.23s 0 0.000
47 1.31s-1.34s 0 0.000
48 1.34s-1.37s 0 0.000
49 1.37s-1.4s 0 0.000
51 1.43s-1.45s 0 0.000
52 1.45s-1.48s 0 0.000
53 1.48s-1.51s 0 0.000
54 1.51s-1.54s 0 0.000
55 1.54s-1.57s 0 0.000
56 1.57s-1.59s 0 0.000
57 1.59s-1.62s 0 0.000
58 1.62s-1.65s 0 0.000
59 1.65s-1.68s 0 0.000
60 1.68s-1.71s 0 0.000
61 1.71s-1.73s 0 0.000
62 1.73s-1.76s 0 0.000
Traffic Generator Stats
Streams Ports Raw
Latency Distribution
Find
Seq ID Tx Packets Tx Rate Rx Packets Rx Rate Lost Packets Lost Rate Lat. Min. Lat. Avg. Lat. Max. Jitter
1 0 83 996.0 kbps 8 96.0 kbps 75 900.0 kbps 716us 39.3ms 78ms 77.3ms
996.0 kbps 6 72.0 kbps 77 924.0 kbps 1.46s 1.72s 1.81s 344ms
3 0 83 996.0 kbps 0 0 bps 83 996.0 kbps
4 0 84 1008.0 kbps 22 264.0 kbps 62 744.0 kbps 2.52s 2.66s 2.78s 251ms
5 0 83 996.0 kbps 38 456.0 kbps 45 540.0 kbps 3.37s 3.62s 3.98s 607ms
6 0 84 1008.0 kbps 28 336.0 kbps 56 672.0 kbps 3.69s 3.85s 4.02s 325ms
7 0 83 996.0 kbps 34 408.0 kbps 49 588.0 kbps 11.1ms 205ms 392ms 381ms
8 0 83 996.0 kbps 96 1152.0 kbps -13 156.0 kbps 137ms 659ms 1.14s 1s
9 0 84 1008.0 kbps 0 0 bps 84 1008.0 kbps
10 0 83 996.0 kbps 34 408.0 kbps 49 588.0 kbps 1.44s 1.68s 2.03s 584ms
11 0 83 996.0 kbps 0 0 bps 83 996.0 kbps
26 items
Stats

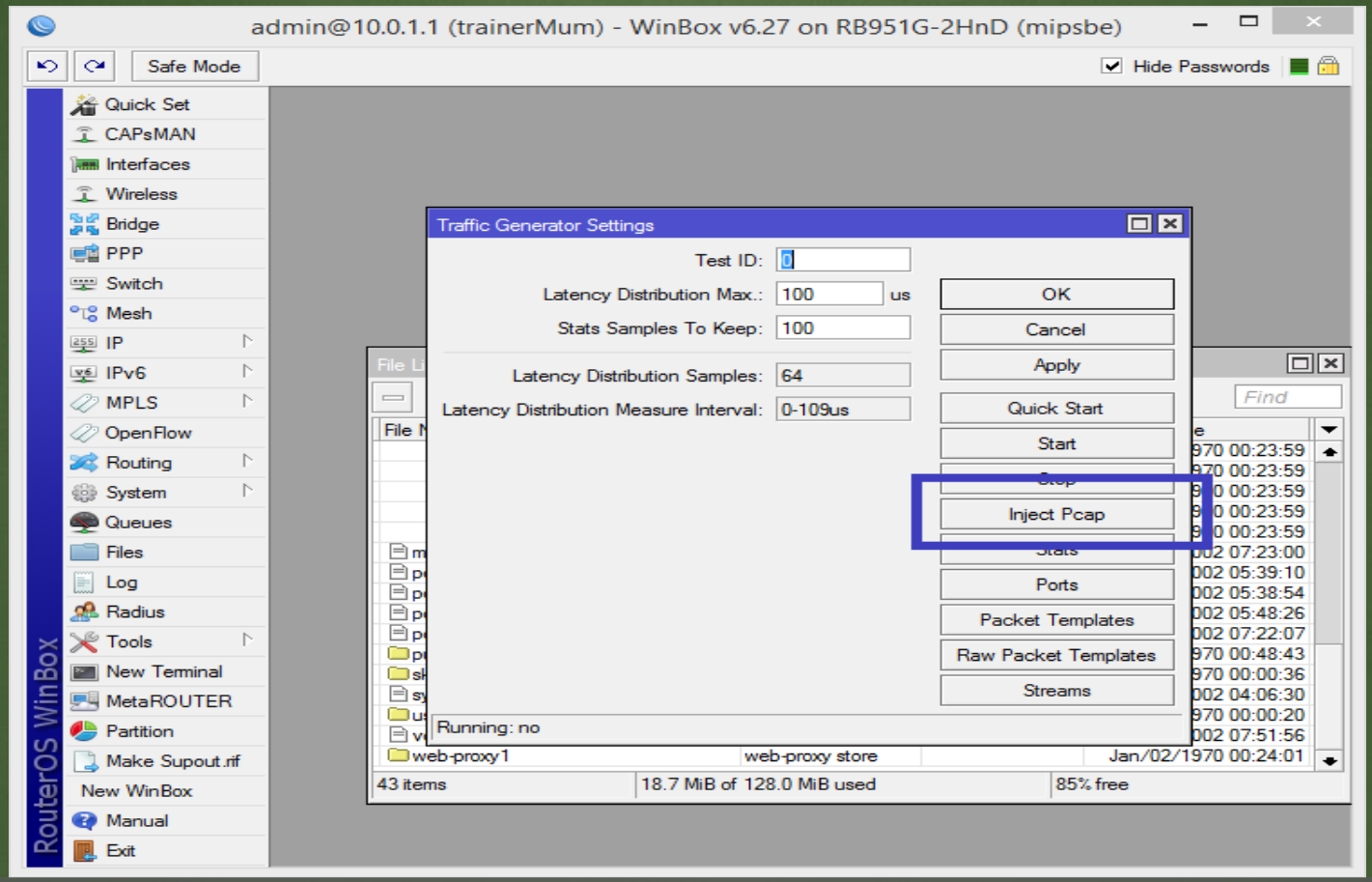
CASE 5

Injecting pcap

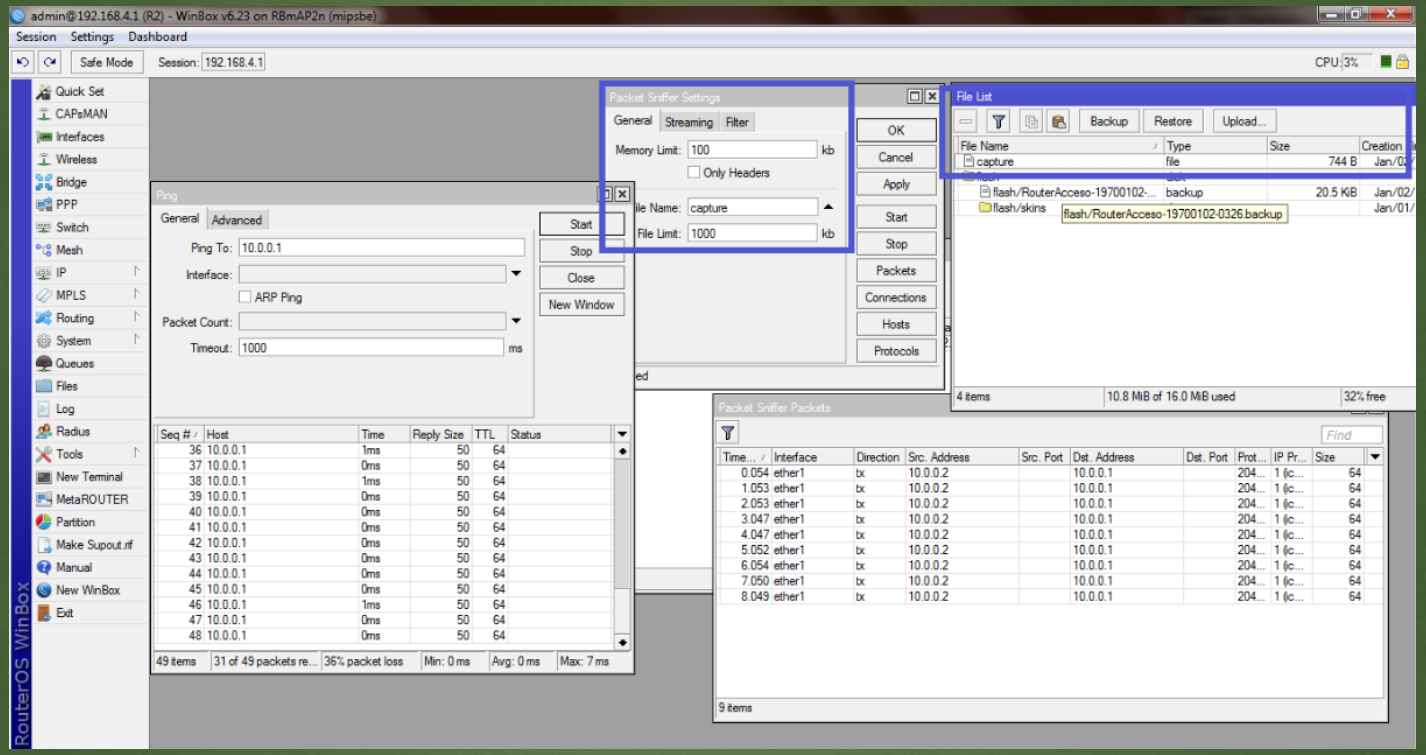
What is pcap?

How can I generate pcap captures?

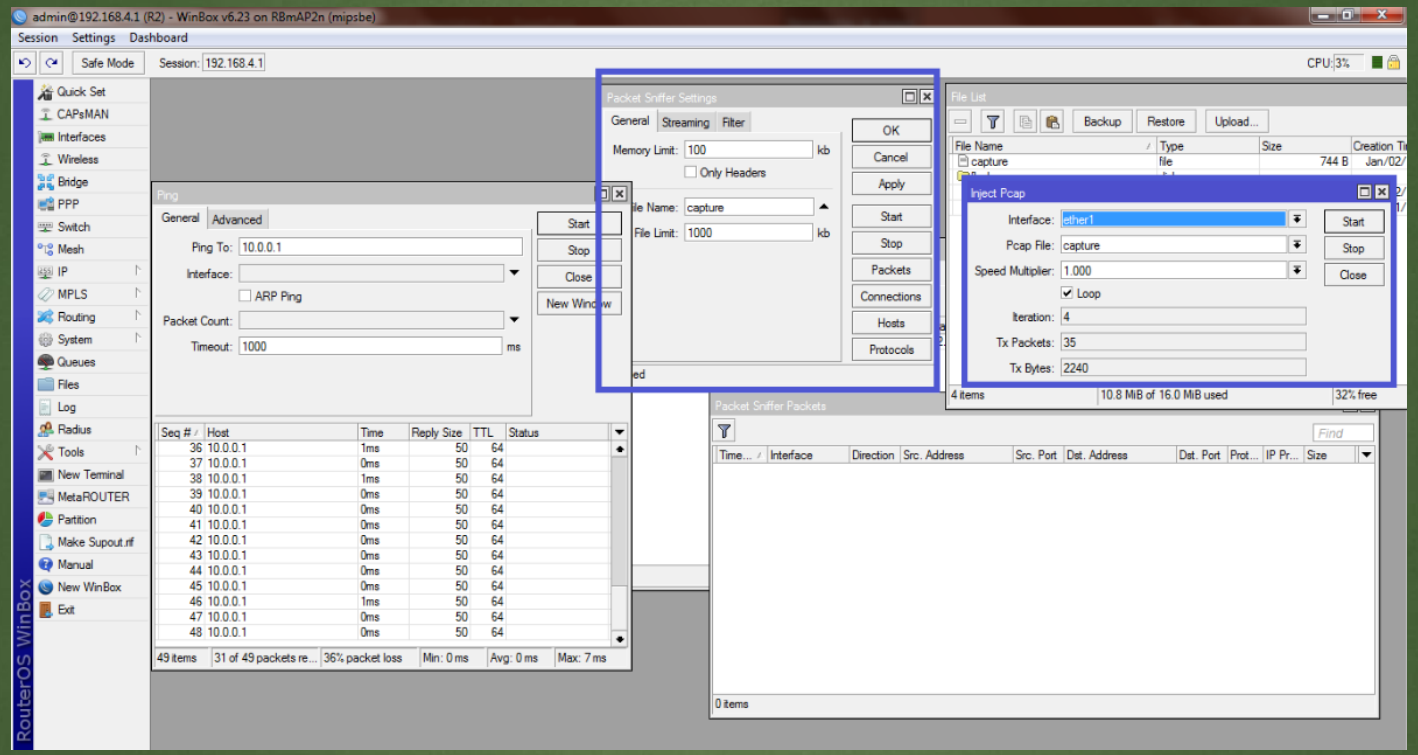

*VirtualBox Host-Only Network
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
Expression...
No. Time Source Destination Protocol Length Info
130 7… 192.168.56.102 192.168.56.1 TCP 1112 8291 → 49249 [PSH, ACK] Seq=28631 Ack=2202 Win=2113 Len=1058
131 7… 192.168.56.3 192.168.56.1 TCP 400 8291 → 49235 [PSH, ACK] Seq=31066 Ack=2076 Win=501 Len=346
132 7… 192.168.56.3 192.168.56.1
133 7… 192.168.56.3 192.168.56.1
134 7… 192.168.56.3 192.168.56.1
135 7… 192.168.56.102 192.168.56.1
136 7… 192.168.56.3 192.168.56.1
Frame 1: 1514 bytes on wire (12112 bits), 1514 by
Ethernet II, Src: PcsCompu_54:a6:cf (08:00:27:54
Internet Protocol Version 4, Src: 192.168.56.102
Transmission Control Protocol, Src Port: 8291, D
Data (1460 bytes)
0000 0a 00 27 00 00 13 08 00 27 54 a6 cf 08 00 45
0010 05 dc b4 5e 40 00 40 06 8f 05 c0 a8 38 66 c0
0020 38 01 20 63 c0 61 f0 a0 89 96 a3 a2 a0 8f 50
0030 08 41 a9 66 00 00 ff 01 08 83 4d 32 01 00 ff
0040 02 00 00 00 00 00 08 00 00 00 02 00 ff 88 01
Wireshark: Save file as
Guardar en: Escritorio
Sitios recientes
Escritorio
Bibliotecas
Equipo
Red
Bibliotecas
Carpeta de sistema
Grupo en el hogar
Carpeta de sistema
Jose Manuel Roman
Carpeta de sistema
Equipo
Carpeta de sistema
Red
Carpeta de sistema
Downloads
Acceso directo
989 bytes
Nombre: capture
Tipo: Wireshark/... - pcapng (*.pcapng;*.pcapng.gz;*.ntar;*.nta
Guardar
Cancelar
Ayuda
Compress with gzip


admin@10.0.1.1 (trainerMum) - WinBox v6.27 on RB951G-2HnD (mipsbe)
Safe Mode
Hide Passwords
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
IPv6
MPLS
OpenFlow
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
New WinBox
Manual
Exit
RouterOS WinBox
Traffic Generator Settings
Test ID:
Latency Distribution Max.:
100
us
Stats Samples To Keep:
100
Latency Distribution Samples:
64
Latency Distribution Measure Interval:
0-109us
OK
Cancel
Apply
Quick Start
Start
Inject Pcap
Ports
Packet Templates
Raw Packet Templates
Streams
Running: no
Find
web-proxy1
web-proxy store
Jan/02/1970 00:24:01
43 items
18.7 MiB of 128.0 MiB used
85% free

Inject pcap


admin@192.168.4.1 (R2) - WinBox v6.23 on RBmAP2n (mipsbe)
Session Settings Dashboard
Safe Mode
Session: 192.168.4.1
CPU: 3%
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Packet Sniffer Settings
General Streaming Filter
Memory Limit: 100 kb
Only Headers
File Name: capture
File Limit: 1000 kb
OK
Cancel
Apply
Start
Stop
Packets
Connections
Hosts
Protocols
File List
Backup
Restore
Upload...
File Name
Type
Size
Creation
capture
file
744 B
flash/RouterAcceso-19700102-...
backup
20.5 KiB
flash/skins
flash/RouterAcceso-19700102-0326.backup
4 items
10.8 MiB of 16.0 MiB used
32% free
Ping
General Advanced
Ping To: 10.0.0.1
Interface:
ARP Ping
Packet Count:
Timeout: 1000 ms
Start
Stop
Close
New Window
Seq # Host Time Reply Size TTL Status
36 10.0.0.1 1ms 50 64
37 10.0.0.1 0ms 50 64
38 10.0.0.1 1ms 50 64
39 10.0.0.1 0ms 50 64
40 10.0.0.1 0ms 50 64
41 10.0.0.1 0ms 50 64
42 10.0.0.1 0ms 50 64
43 10.0.0.1 0ms 50 64
44 10.0.0.1 0ms 50 64
45 10.0.0.1 0ms 50 64
46 10.0.0.1 1ms 50 64
47 10.0.0.1 0ms 50 64
48 10.0.0.1 0ms 50 64
49 items
31 of 49 packets re...
36% packet loss
Min: 0 ms
Avg: 0 ms
Max: 7 ms
Packet Sniffer Packets
Find
Time... Interface Direction Src. Address Src. Port Dst. Address Dst. Port Prot... IP Pr... Size
0.054 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
1.053 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
2.053 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
3.047 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
4.047 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
5.052 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
6.054 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
7.050 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
8.049 ether1 tx 10.0.0.2 10.0.0.1 204... 1 (c... 64
9 items

Inject pcap


admin@192.168.4.1 (R2) - WinBox v6.23 on RBmAP2n (mipsbe)
Session Settings Dashboard
Safe Mode
Session: 192.168.4.1
CPU: 3%
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Packet Sniffer Settings
General Streaming Filter
Memory Limit: 100 kb
Only Headers
File Name: capture
File Limit: 1000 kb
OK
Cancel
Apply
Start
Stop
Packets
Connections
Hosts
Protocols
Ping
General Advanced
Ping To: 10.0.0.1
Interface:
ARP Ping
Packet Count:
Timeout: 1000 ms
Start
Stop
Close
New Window
Seq # Host Time Reply Size TTL Status
36 10.0.0.1 1ms 50 64
37 10.0.0.1 0ms 50 64
38 10.0.0.1 1ms 50 64
39 10.0.0.1 0ms 50 64
40 10.0.0.1 0ms 50 64
41 10.0.0.1 0ms 50 64
42 10.0.0.1 0ms 50 64
43 10.0.0.1 0ms 50 64
44 10.0.0.1 0ms 50 64
45 10.0.0.1 0ms 50 64
46 10.0.0.1 1ms 50 64
47 10.0.0.1 0ms 50 64
48 10.0.0.1 0ms 50 64
49 items
31 of 49 packets re...
36% packet loss
Min: 0 ms
Avg: 0 ms
Max: 7 ms
File List
Backup
Restore
Upload...
File Name
Type
Size
capture
file
744 B
Inject Pcap
Interface: ether1
Pcap File: capture
Speed Multiplier: 1.000
Loop
Iteration: 4
Tx Packets: 35
Tx Bytes: 2240
Start
Stop
Close
4 items
10.8 MiB of 16.0 MiB used
32% free
Packet Sniffer Packets
Find
Time... Interface Direction Src. Address Src. Port Dst. Address Dst. Port Prot... IP Pr... Size
0 items

Inject pcap

Conclusion


ANY
QUESTIONS
?

Grazie mille!

Jose.roman@fibercli.com