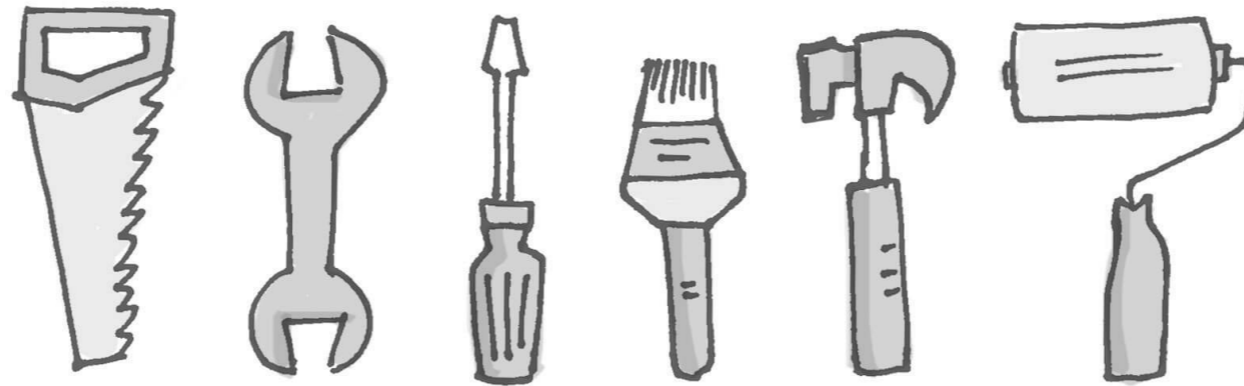


# MikroTik

## RouterOS Tools

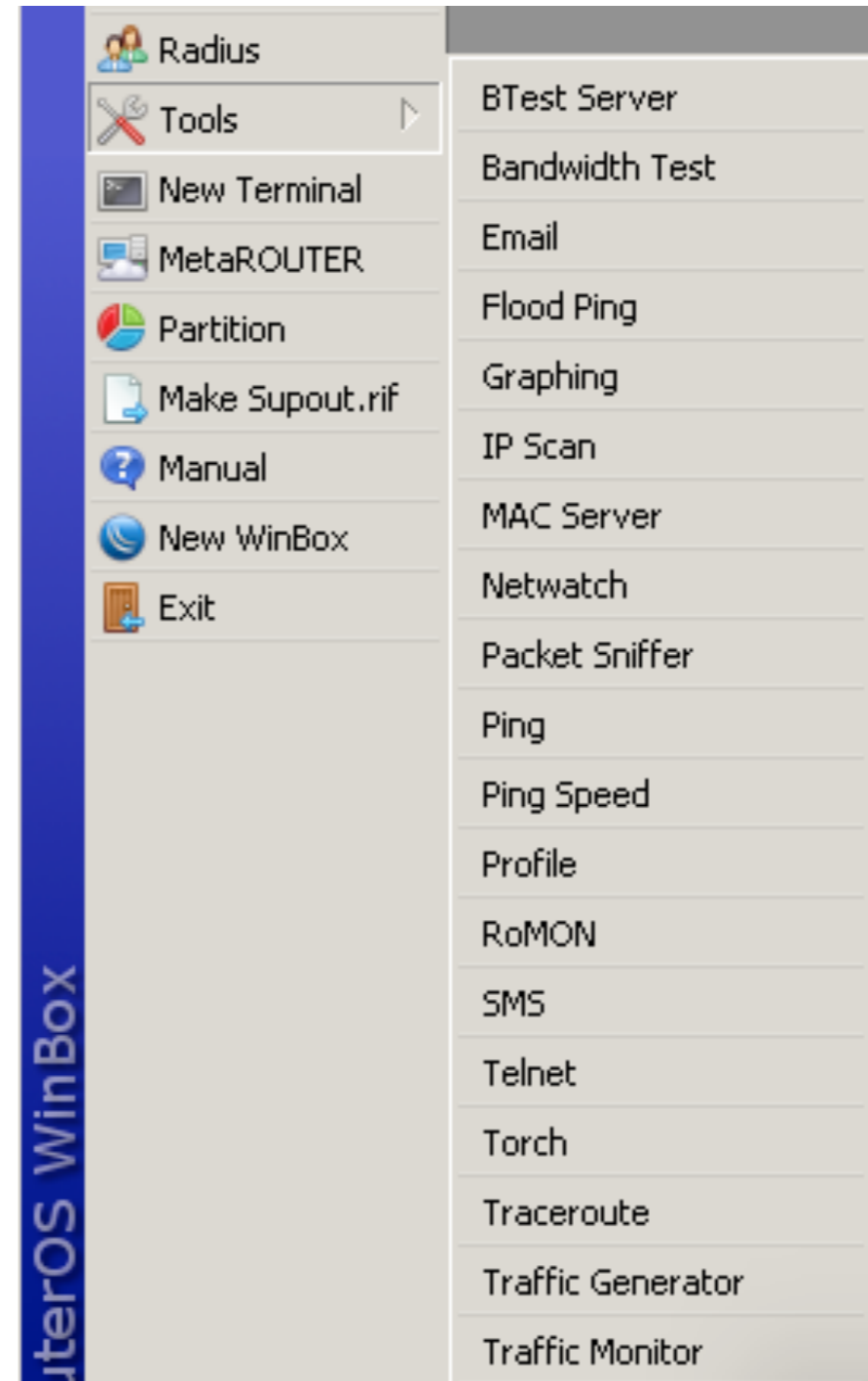


# About Me

- **Name: Chan Ty**
- **Experience: Routing, Switching and QoS**
- **Certified to deliver: MTCNA, MTCRE, MTCINE and MTCTCE**

# Agenda

- I am going to present some usual tools that is available in RouterOS
- Most of them are under **Tools** menu



# IP Scan

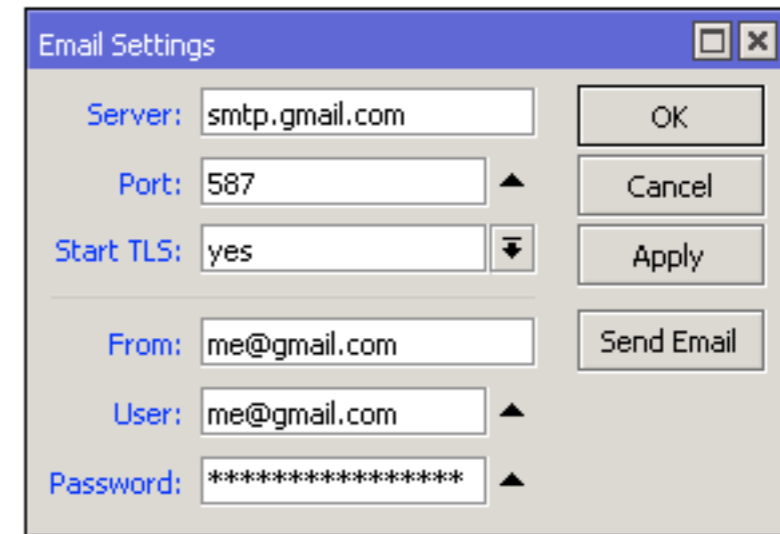
- IP Scan tool allows user to scan network based on some network prefix or by setting interface to listen to
- Either way tool collects data from the network

Address	MAC Address	Time (ms)	DNS	SNMP	Netbios
192.168.86.1	5C:26:0A:F2:E8:7A	6			
192.168.86.3	00:80:45:4B:96:19	5			
192.168.86.4	00:80:45:4B:75:F5	4			
192.168.86.10	00:02:D1:33:93:4D	22			
192.168.86.17	00:02:D1:23:18:23	17			
192.168.86.18	00:02:D1:23:18:18	17			
192.168.86.19	00:02:D1:4C:2F:26	17			
192.168.86.20	00:02:D1:33:93:63	9			
192.168.86.24	08:00:37:75:0D:8E	17		DELL750D8E	
192.168.86.40	00:30:6E:FD:FE:AF	7		NPIFDFEAF	
192.168.86.41	00:04:A3:FF:2F:63	351			

Tools → IP Scan

# E-mail

- Allows to send e-mails from the router
- For example to send router backup



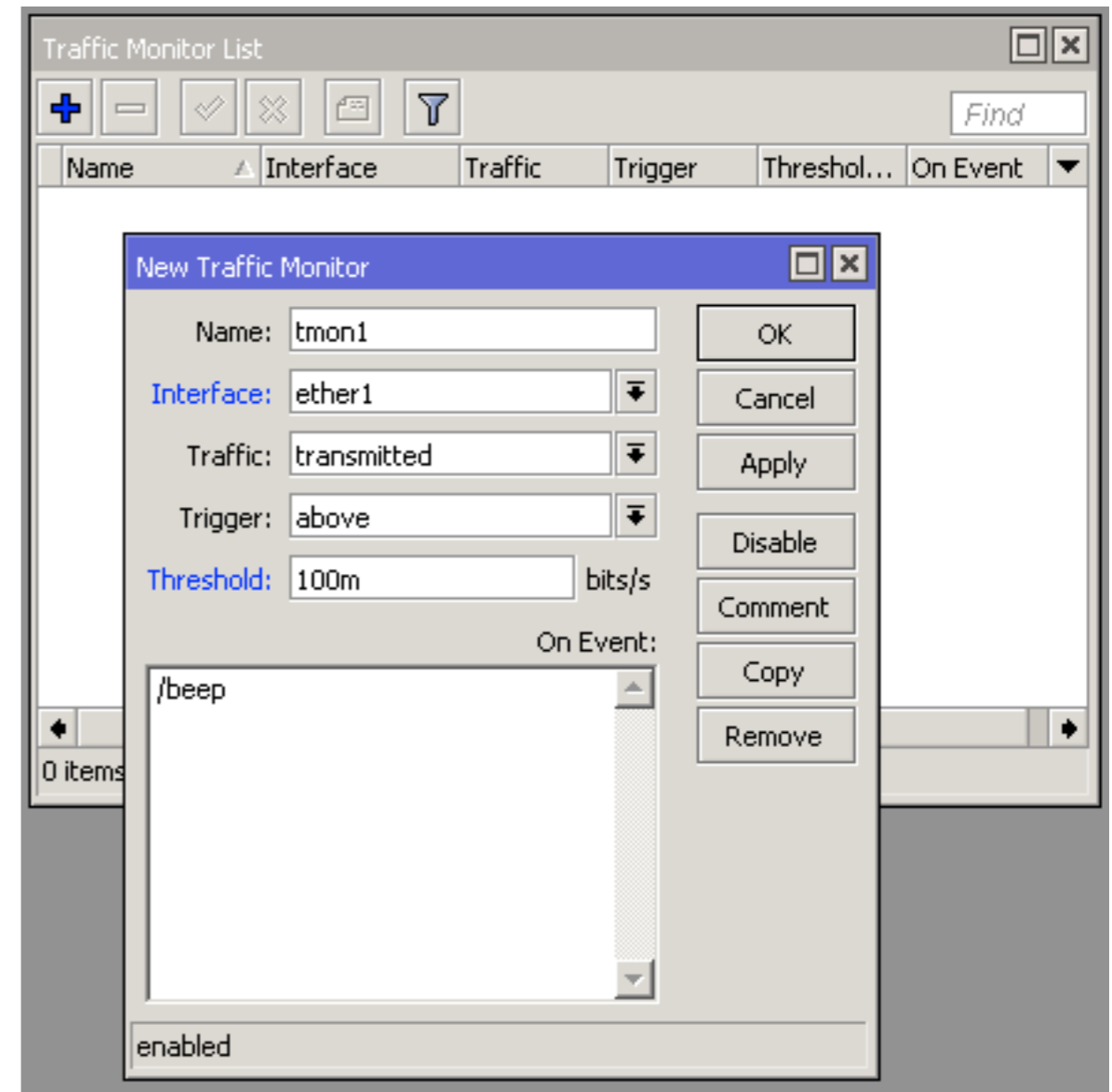
Tools → Email

```
/export file=export  
/tool e-mail send to=you@gmail.com\  
  subject="$[/system identity get name] export"\  
  body="$[/system clock get date]\  
  configuration file" file=export.rsc
```

A script to make an export file and send it via e-mail

# Traffic Monitor

- Traffic Monitor tool is used to execute console script when interface traffic crosses a given threshold



Tools → Traffic Monitor

# Profiler

- Profiler tool show CPU usage for each process running in RouterOS
- It helps to identify which process is using most of the CPU resources

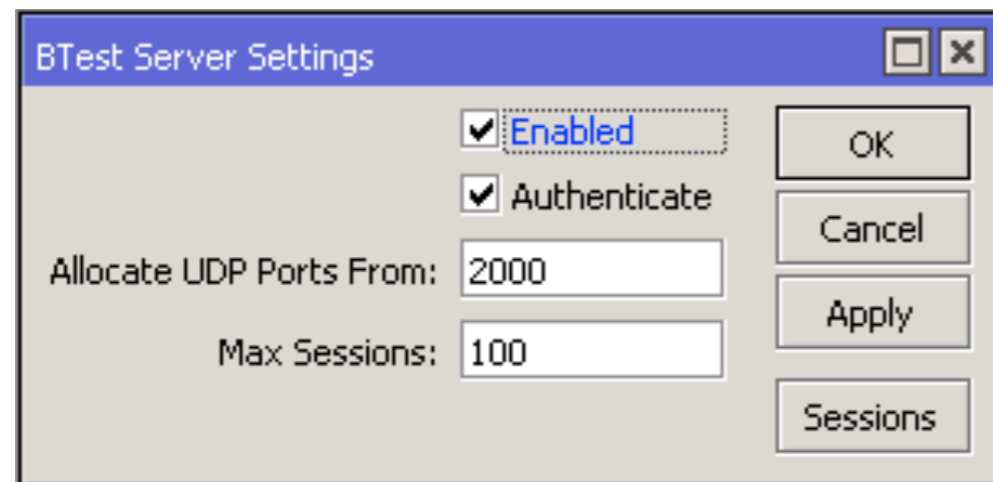
Name	CPU	Usage
cpu1		6.5
cpu0		5.5
networking	0	3.5
firewall	1	3.5
networking	1	0.5
firewall	0	1.5
ethernet	1	1.5
ethernet	0	0.5
dns	1	0.5
queuing	1	0.5
management	0	0.0
dns	0	0.0
mpls	0	0.0
pptp	0	0.0
queuing	0	0.0
routing	0	0.0
management	1	0.0
mpls	1	0.0
routing	1	0.0

19 items

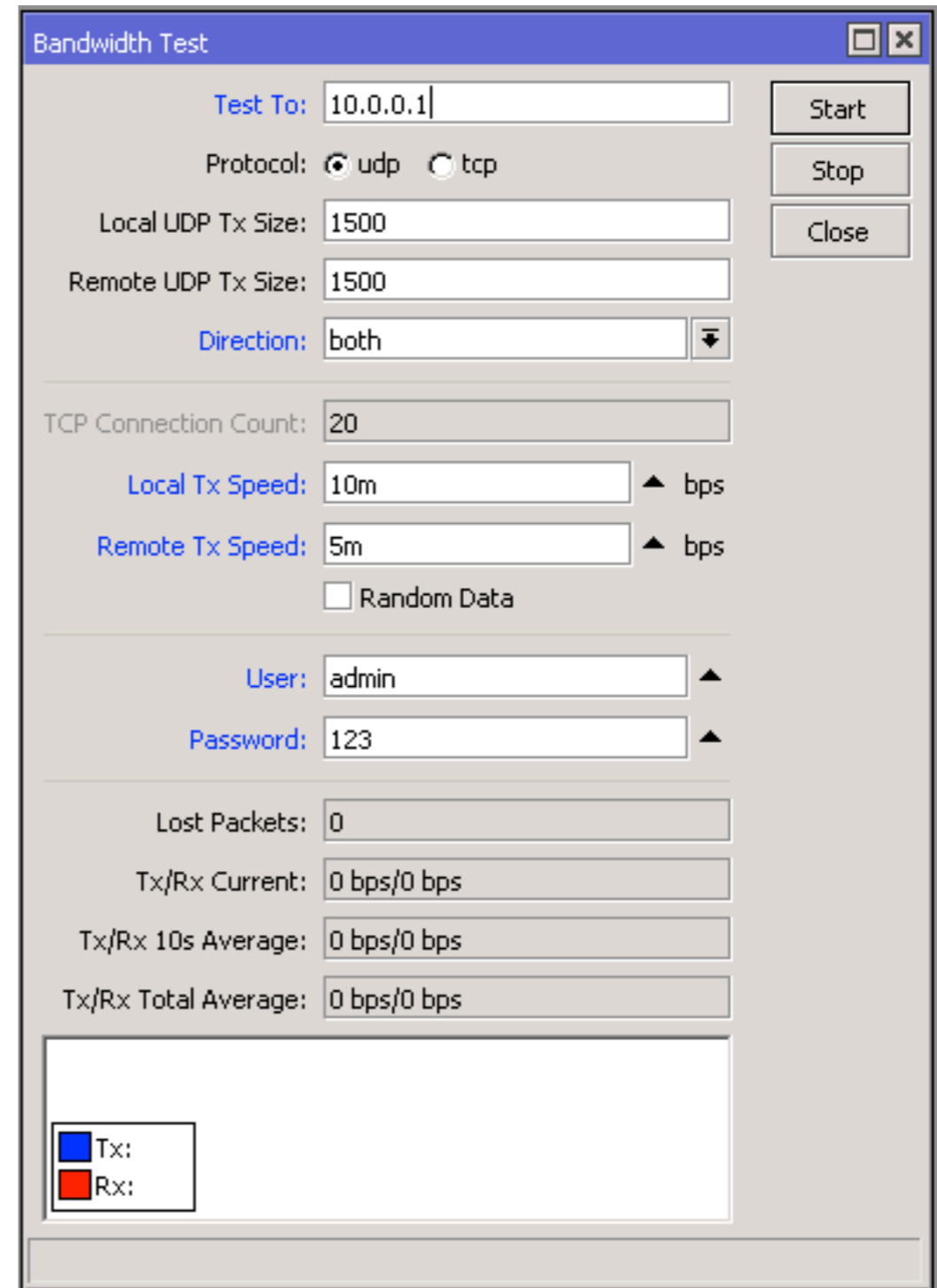
Tools → Profiles

# Bandwidth Test

- The Bandwidth Tester can be used to measure the throughput to another MikroTik router and thereby help to discover network bottlenecks
- Support both TCP and UDP



Tools → BTest Server



Tools → Bandwidth Test



# Bandwidth Test

The screenshot displays the Mikrotik WinBox interface for a RouterOS device. The main window shows the configuration for interface `ether6`. A bandwidth test is running, with the following parameters:

- Test To: 10.1.1.100
- Protocol: tcp
- Local UDP Tx Size: 1500
- Remote UDP Tx Size: 1500
- Direction: receive
- TCP Connection Count: 1
- User: admin
- Password: (empty)
- Lost Packets: 0
- Tx/Rx Current: 0 bps/24.2 Mbps
- Tx/Rx 10s Average: 0 bps/24.2 Mbps
- Tx/Rx Total Average: 0 bps/24.2 Mbps

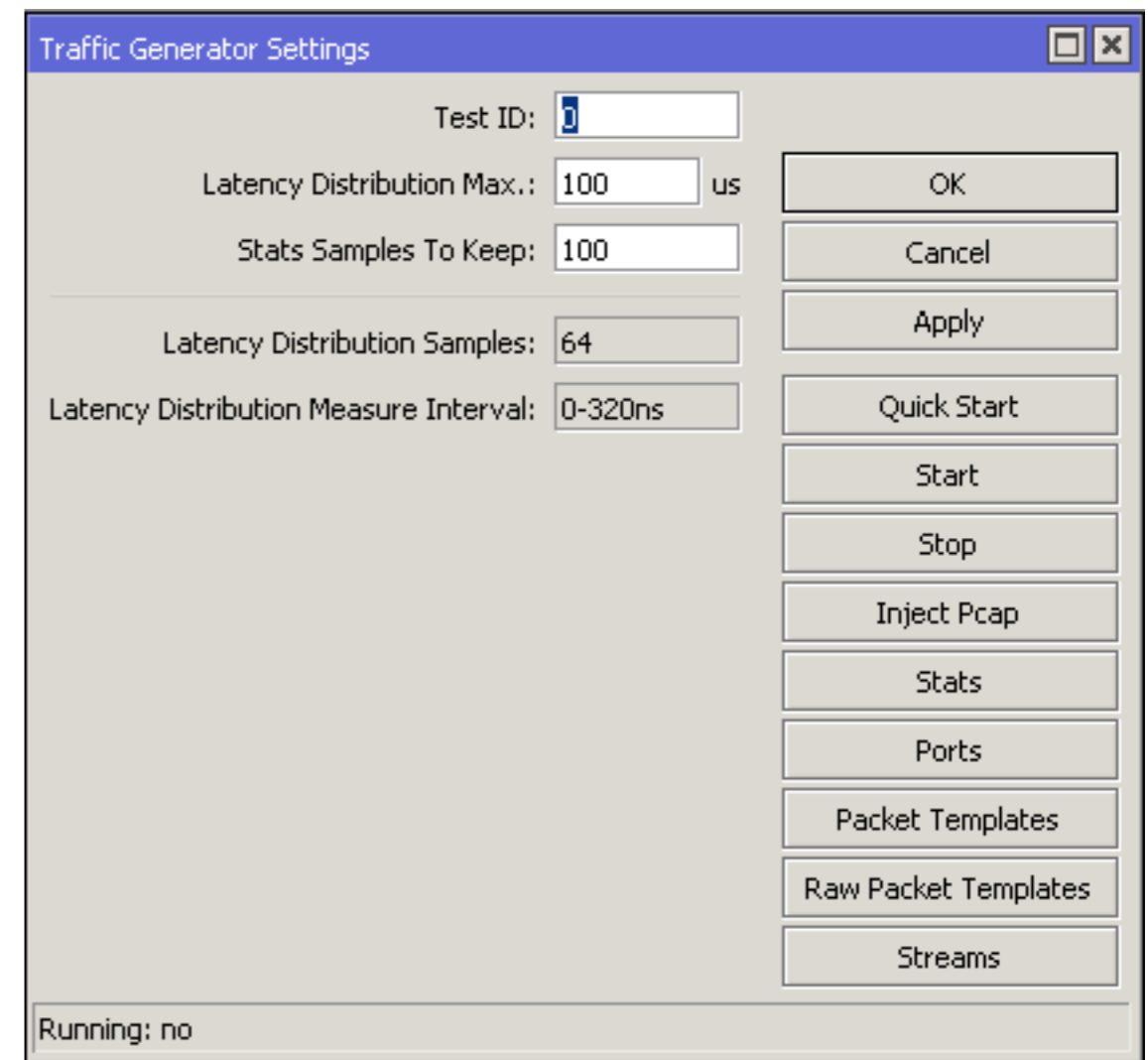
The interface `ether6` status is shown as `running`. The traffic statistics for `ether6` are:

Metric	Value	Target
Tx/Rx Rate	557.4 kbps	25.5 Mbps
Tx/Rx Packet Rate	1 056 p/s	2 110 p/s
Tx/Rx Bytes	654.9 GiB	24.3 GiB
Tx/Rx Packets	466 978 053	237 465 342
Tx/Rx Drops	7	0
Tx/Rx Errors	0	0

The interface also shows two graphs: one for Tx/Rx Rate (557.4 kbps Tx, 25.5 Mbps Rx) and one for Tx/Rx Packet Rate (1 056 p/s Tx, 2 110 p/s Rx). The status bar at the bottom indicates `enabled`, `running`, `slave`, and `link ok`.

# Traffic Generator

- Traffic Generator is a tool that allows to evaluate performance of DUT (Device Under Test)
- Tool can generate and send RAW packets over specific port



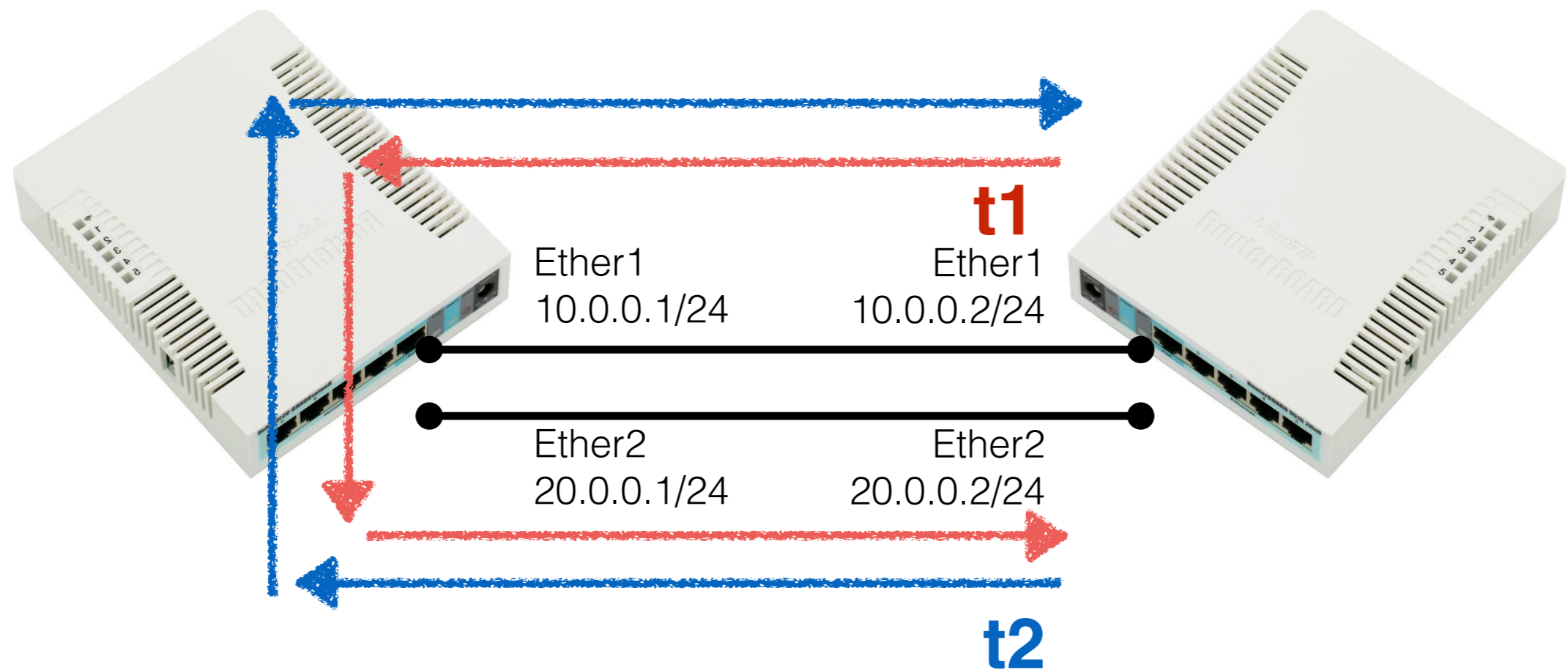
Tools → Traffic Generator

# Traffic Generator

DUT

Traffic Generator

Firewall  
Queue  
Mangle  
...



# Traffic Generator

- Traffic Generator Configuration

```
/tool traffic-generator packet-template  
add header-stack=mac,ip,upd ip-dst=20.0.0.2 ip-gateway=10.0.0.1 name=t1  
add header-stack=mac,ip,upd ip-dst=10.0.0.2 ip-gateway=20.0.0.1 name=t2
```

A script to make an T1 and T2 packet template

```
[admin@MikroTik] > tool traffic-generator quick tx-template=t1,t2 packet-size=60 mbps=10
```

SEQ	ID	TX-PACKET	TX-RATE	RX-PACKET	RX-RATE	RX-000	LOST-PACKET	LOST-RATE	LAT-MIN	LAT-AVG	LAT-MAX	JITTER
9	1	20 834	10.0Mbps	20 834	10.0Mbps	0	0	0bps	26.5us	82.7us	392us	366us
9	TOT	41 669	20.0Mbps	41 669	20.0Mbps	0	0	0bps	24.7us	72.6us	392us	367us
10	0	20 331	9.7Mbps	20 331	9.7Mbps	0	0	0bps	24.6us	49.3us	245us	221us
10	1	20 332	9.7Mbps	20 332	9.7Mbps	0	0	0bps	25.5us	60.2us	298us	272us
10	TOT	40 663	19.5Mbps	40 663	19.5Mbps	0	0	0bps	24.6us	54.7us	298us	273us
11	0	21 335	10.2Mbps	21 335	10.2Mbps	0	0	0bps	24.3us	49.8us	256us	232us
11	1	21 335	10.2Mbps	21 335	10.2Mbps	0	0	0bps	26.3us	61.1us	335us	309us
11	TOT	42 670	20.4Mbps	42 670	20.4Mbps	0	0	0bps	24.3us	55.5us	335us	311us

A command to generate T1 and T2 traffic

# Traffic Generator

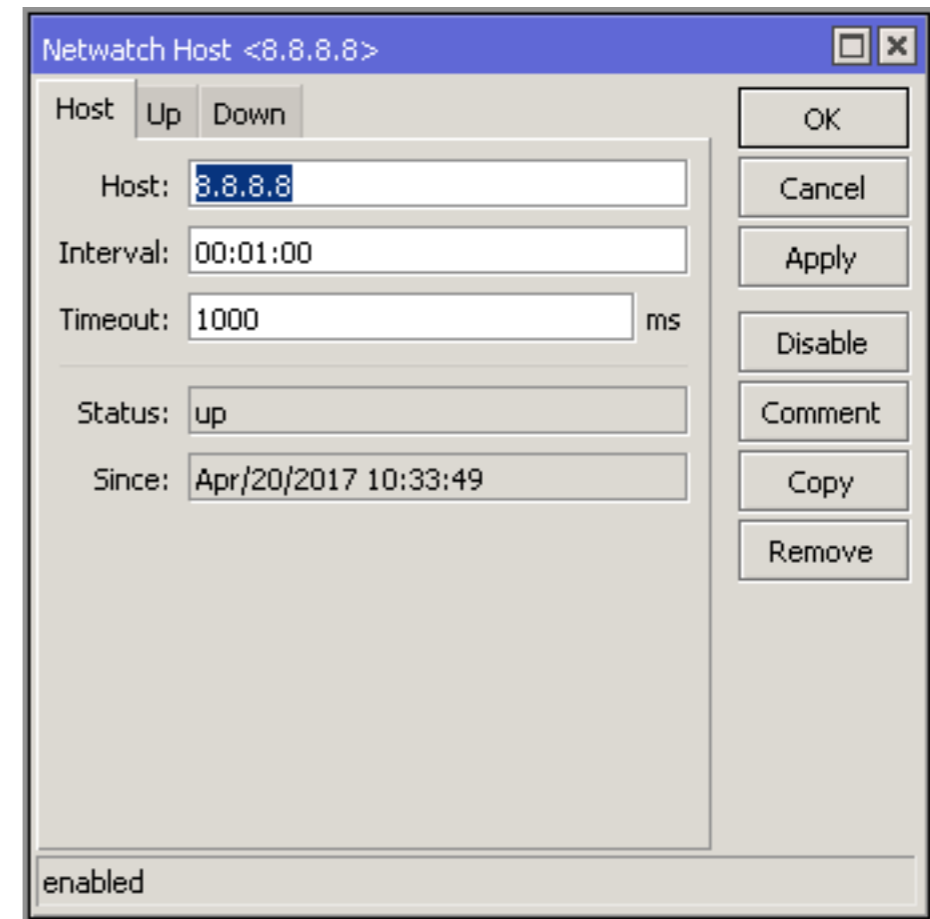
- Device Under Test (DUT)

```
admin@MikroTik] > interface monitor-traffic aggregate, ether1, ether2
      name:                ether1-gateway ether2-master-local
rx-packets-per-second:    42 026          21 000          21 002
rx-drops-per-second:      0              0              0
rx-errors-per-second:     0              0              0
rx-bits-per-second:       21.5Mbps        10.7Mbps        10.7Mbps
tx-packets-per-second:    42 023          21 000          20 999
tx-drops-per-second:      0              0              0
tx-errors-per-second:     0              0              0
tx-bits-per-second:       21.5Mbps        10.7Mbps        10.7Mbps
```

A command to see traffic statistic on Aggregate, Ether1 and Ether2

# Netwatch

- Monitor state of hosts on the network
- Send ICMP echo request (ping)
- Can execute a script when a host becomes unreachable or reachable

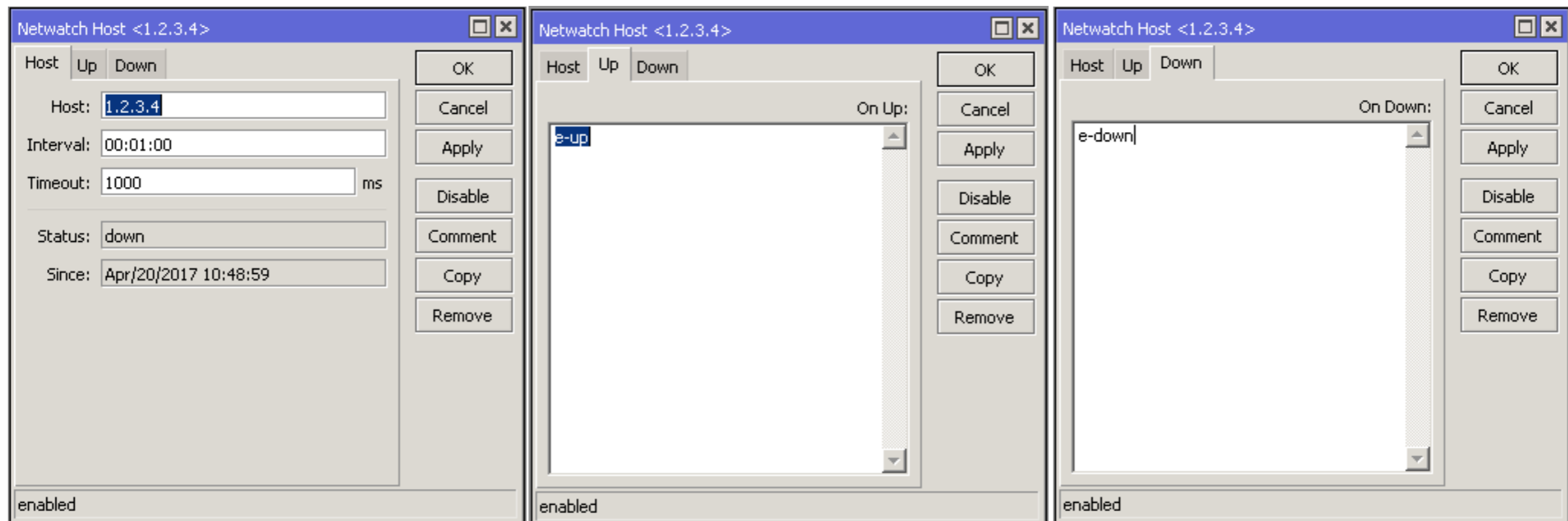


Tools → Netwatch

# Netwatch

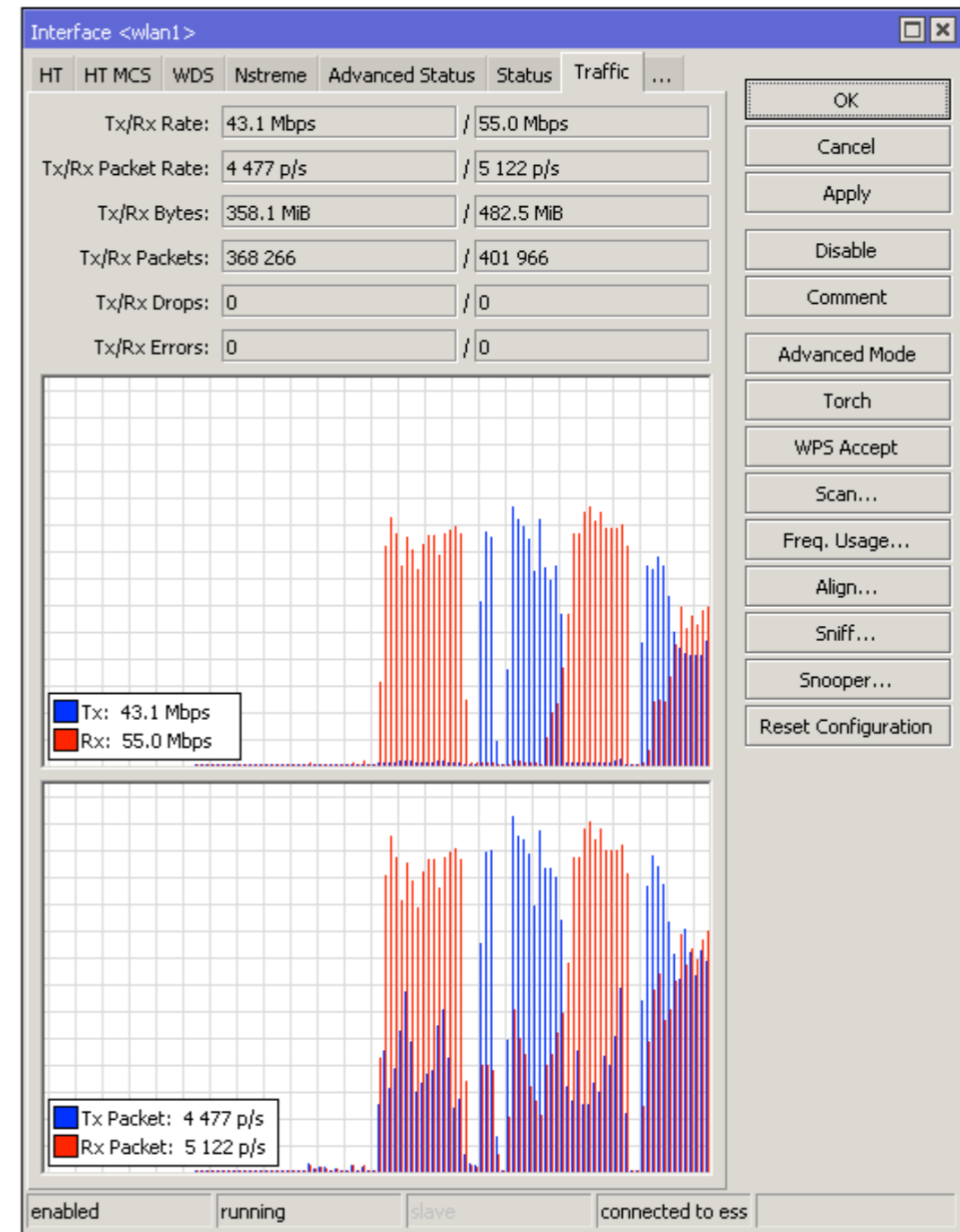
```
/system script add name=e-down source="/tool e-mail send  
from=router1@example.com server=smtp.example.com body="Your Internet line  
1 is down" to=helpdesk@example.com"
```

```
/system script add name=e-up source="/tool e-mail send  
from=router1@example.com server=smtp.example.com body="Your Internet line  
1 is up" to=helpdesk@example.com"
```



# Interface Traffic Monitor

- Real time traffic status
- Available for each interface in traffic tab
- Can also be accessed from both WebFig and command line interface



Interfaces → wlan1 → Traffic

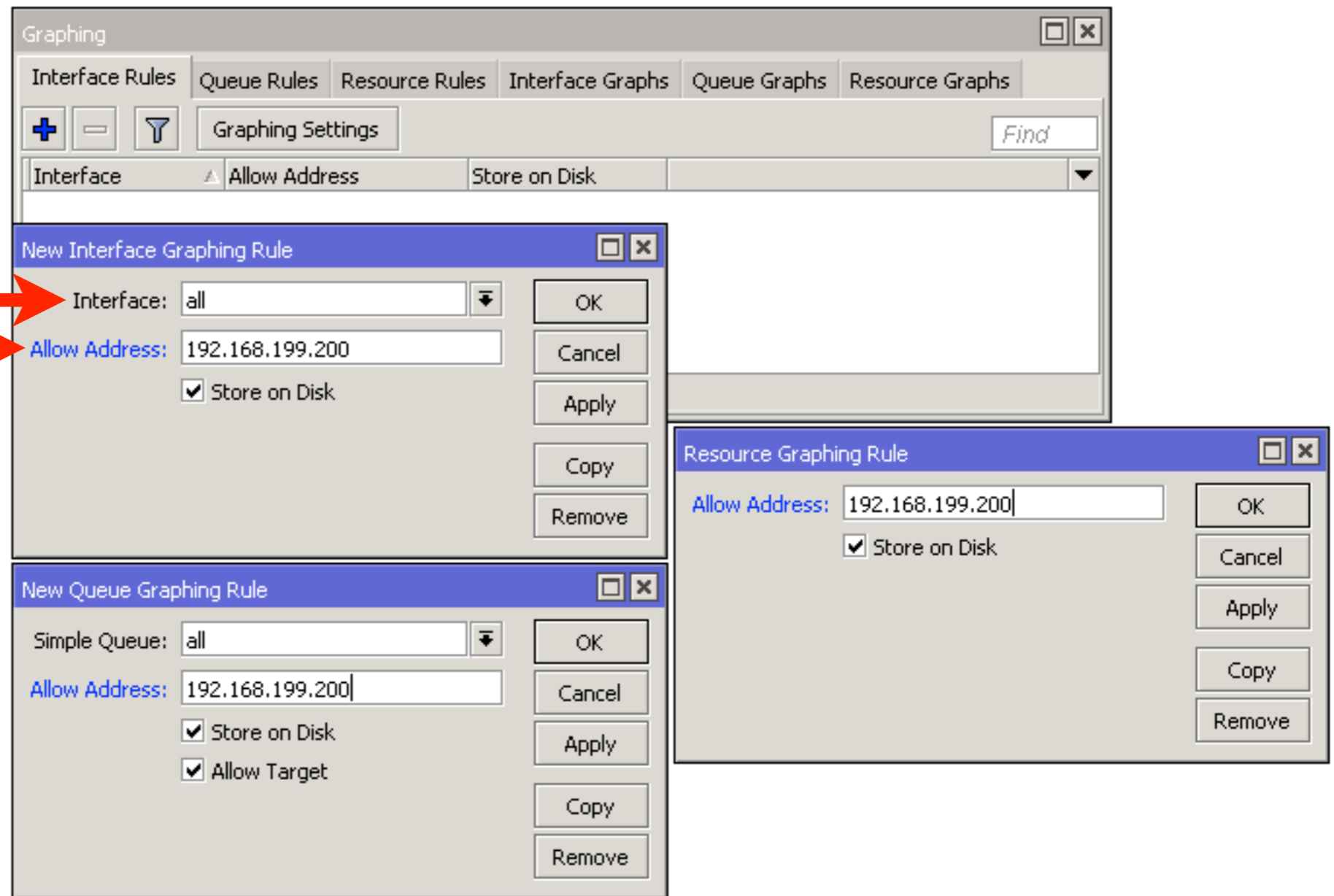


# Graphing

- RouterOS can generate graphs showing how much traffic has passed through an interface or a queue
- Can show CPU, memory and disk usage
- For each metric there are 4 graphs - daily, weekly, monthly and yearly

# Graphing

**Set specific interface to monitor or leave all, set IP address/subnet which will be able to access the graphs**



Tools → Graphing

# Graphing

## Traffic and system resource graphing

[CPU usage](#)

[Memory usage](#)

[Disk usage](#)

You have access to 4 queues:

[129](#)

[130](#)

[131](#)

[parent](#)

You have access to 7 interfaces:

[ether1-gateway](#)

[ether2-master-local](#)

[ether3-slave-local](#)

[ether4-slave-local](#)

[ether5](#)

[wlan1](#)

[bridge-local](#)

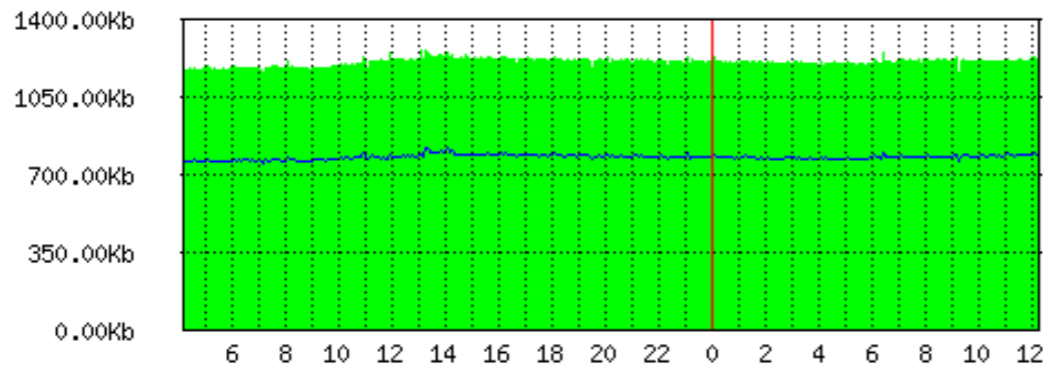
- Available on the router: **[http://router\\_ip/graphs](http://router_ip/graphs)**

# Graphing

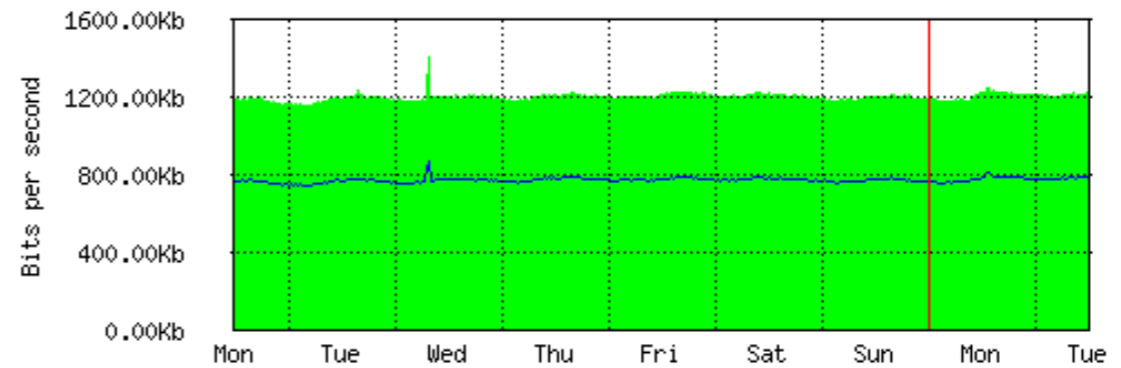
## Interface <ether1-gateway> Statistics

• Last update: Wed Dec 31 23:59:59 2015

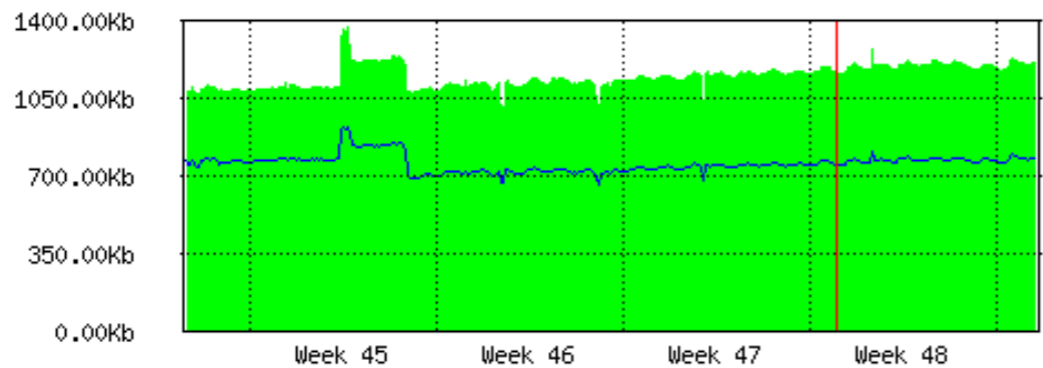
"Daily" Graph (5 Minute Average)



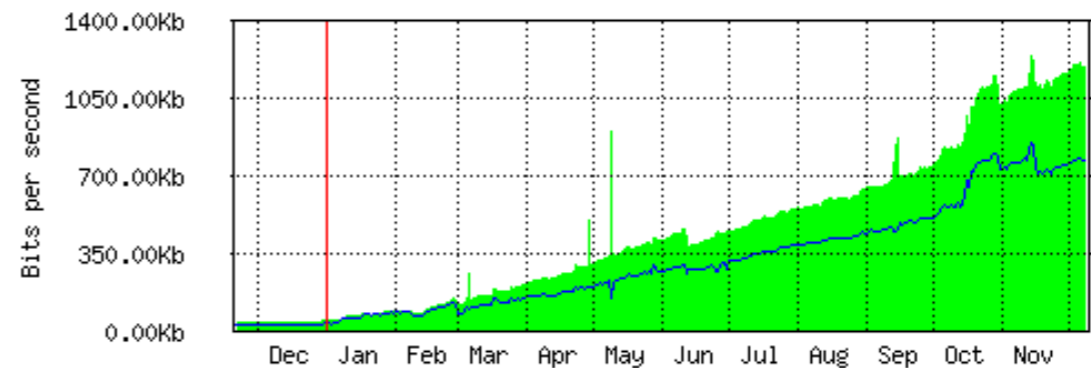
"Weekly" Graph (30 Minute Average)



"Monthly" Graph (2 Hour Average)



"Yearly" Graph (1 Day Average)



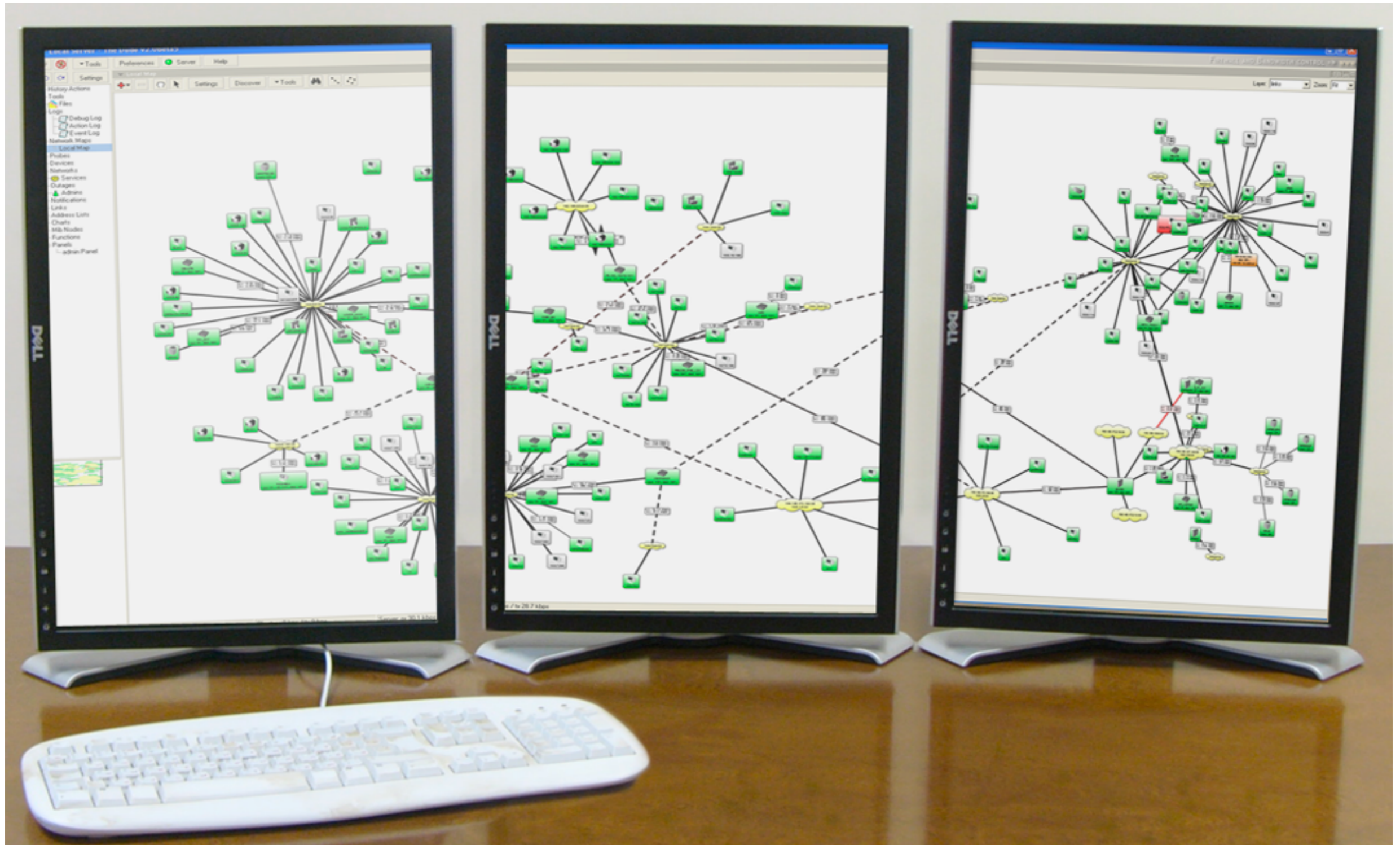
# The Dude

- Application by MikroTik which can dramatically improve the way you manage your network environment
- Automatic discovery and layout map of devices
- Monitoring of services and alerting
- Free of charge

# The Dude

- Support SNMP, ICMP, DNS and TCP monitoring
- Server part run on RouterOS (CCR, CHR, or x86)
- Client on Windows (works on Linux and OS X using Wine)

# The Dude



# Torch

- Real-time monitoring tool
- Can be used to monitor the traffic flow through the interface
- Can monitor traffic classified by IP protocol name, source/destination address (IPv4/IPv6), port number



# Torch

Eth. Protocol	Protocol	Src.	Dst.	Tx Rate	Rx Rate	Tx Packet Rate	Rx Packet Rate
800 (ip)	6 (tcp)	192.168.199.200:58658	159.148.147.196:443 (https)	757.3 kbps	54.9 kbps	68	52
800 (ip)	6 (tcp)	192.168.199.200:58656	159.148.147.196:443 (https)	303.5 kbps	51.1 kbps	28	27
800 (ip)	6 (tcp)	192.168.199.200:58659	159.148.147.196:443 (https)	296.5 kbps	40.9 kbps	29	26
800 (ip)	6 (tcp)	192.168.199.200:58655	159.148.147.196:443 (https)	171.4 kbps	54.0 kbps	22	23
800 (ip)	6 (tcp)	192.168.199.200:58661	159.148.147.196:443 (https)	63.2 kbps	22.5 kbps	6	8
800 (ip)	6 (tcp)	192.168.199.200:58662	159.148.147.196:443 (https)	47.7 kbps	22.4 kbps	6	8
800 (ip)	6 (tcp)	192.168.199.200:58657	159.148.147.196:443 (https)	0 bps	0 bps	0	0

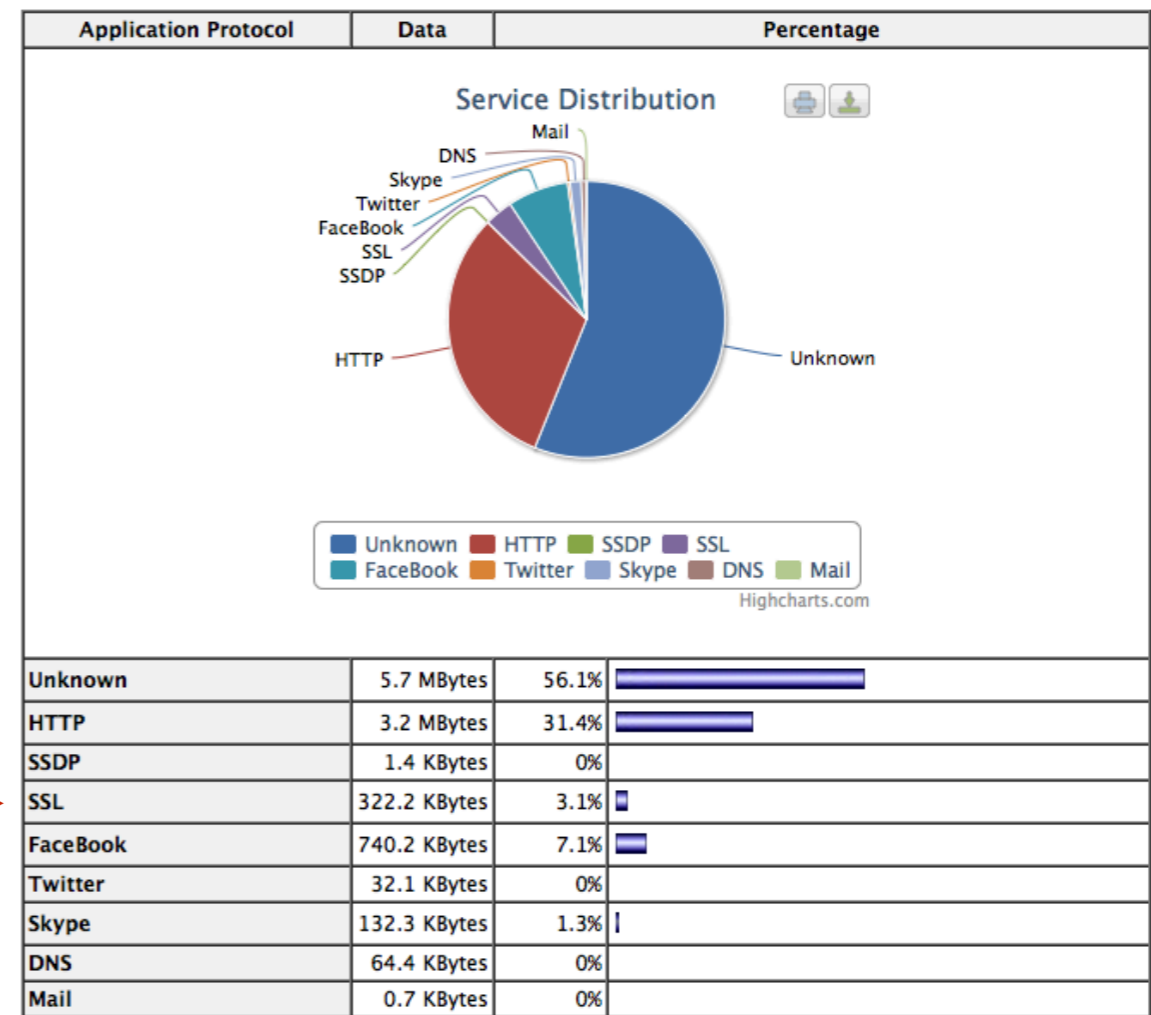
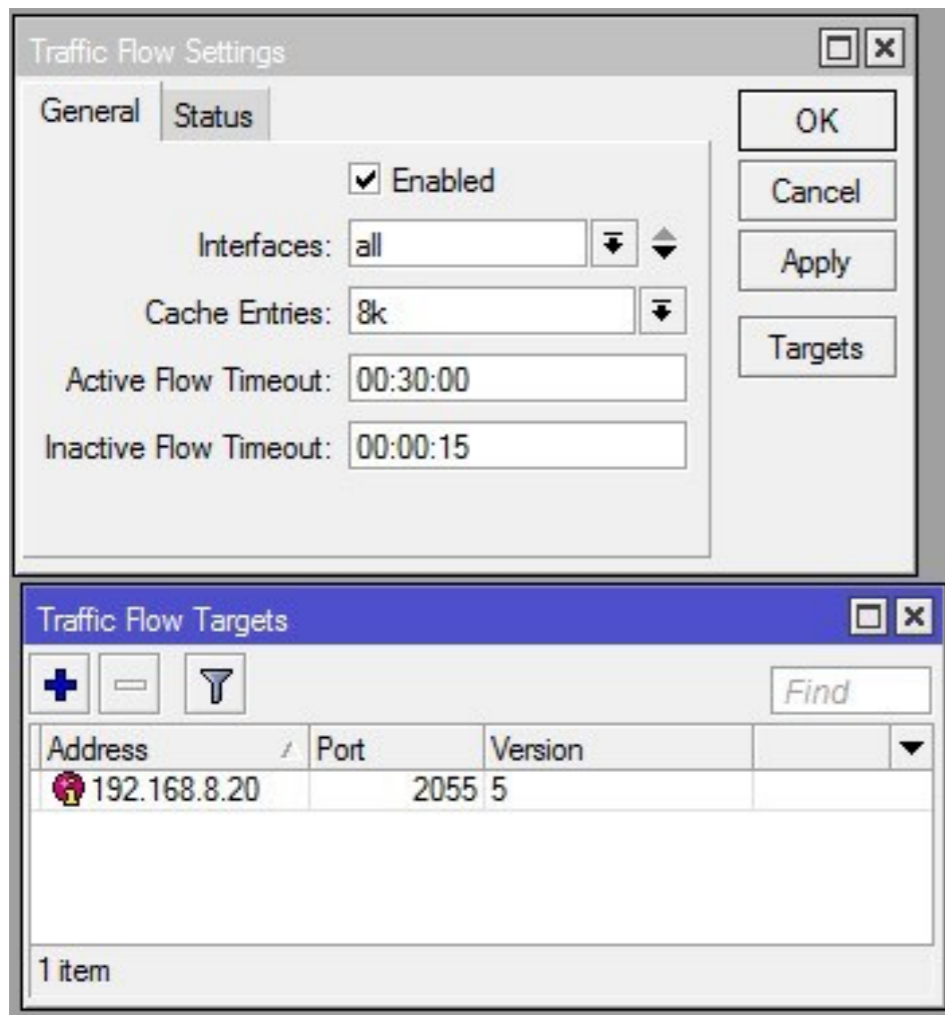
7 items    Total Tx: 1639.8 kbps    Total Rx: 245.9 kbps    Total Tx Packet: 159    Total Rx Packet: 144

Tools → Torch

- Traffic flow from the laptop to the mikrotik.com web server HTTPS port

# Traffic Flow

- Traffic Flow is a system that provides statistic information about packets which pass through the router



Tools → Traffic Flow

www.ntop.org

**That is it!!**

Or Khun  
(Thanks)

