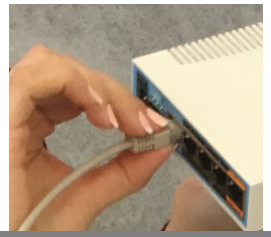

TOP10 RouterOS
configuration mistakes

Presenter – Andis Arins



- MikroTik Consultant at WISP TRACON / routerlv
- MikroTik / Microsoft certified trainer

  - Member of the board in Latvian Internet Association
  - Review expert for EU in future networking research

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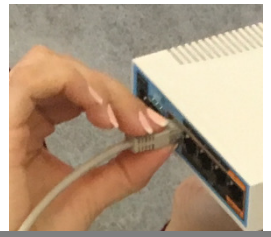
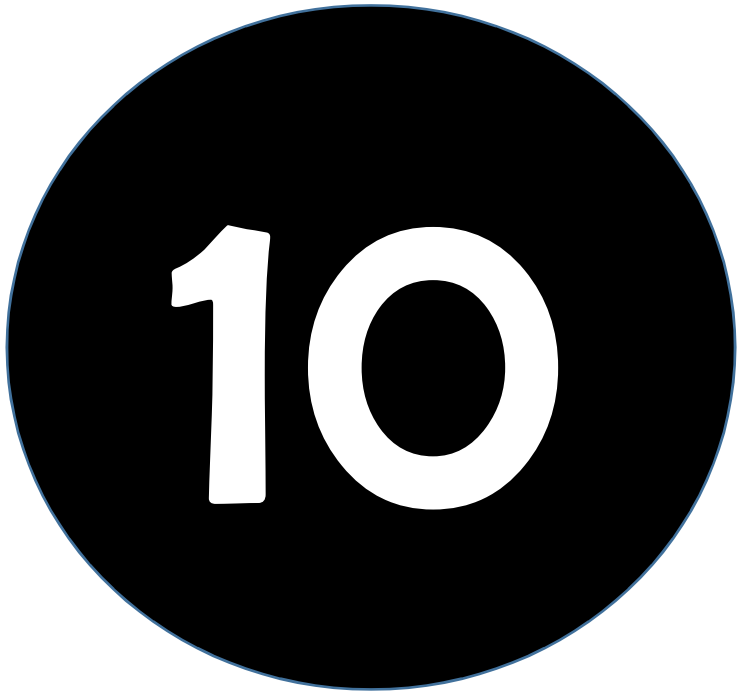
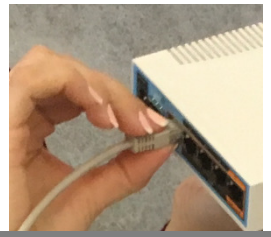
The same IP on multiple interfaces





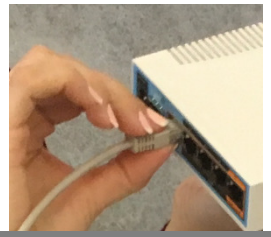
The same IP on multiple interfaces



Address List

	Address	Network	Interface
	10.0.0.1/24	10.0.0.0	ether1
	10.0.0.1/24	10.0.0.0	ether2

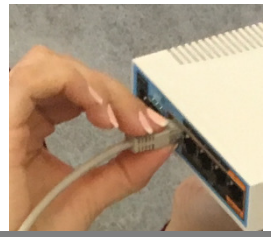
The same IP on multiple interfaces




```
[admin@MUM16TX-AA] > /ip address print
Flags: X - disabled, I - invalid, D - dynamic
 #   ADDRESS            NETWORK         INTERFACE
 0   10.0.0.1/24        10.0.0.0        ether1
 1   10.0.0.1/24        10.0.0.0        ether2
[admin@MUM16TX-AA] >
[admin@MUM16TX-AA] >
[admin@MUM16TX-AA] > /ip route print
Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
 #      DST-ADDRESS        PREF-SRC        GATEWAY             DISTANCE
 0 ADC  10.0.0.0/24        10.0.0.1        ether1                     0
                                           ether2
```

survival strategy: MAC telnet or connection from different network

Lack of monitoring



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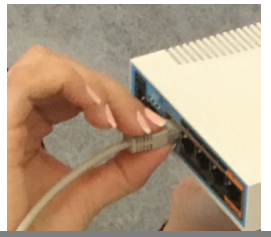
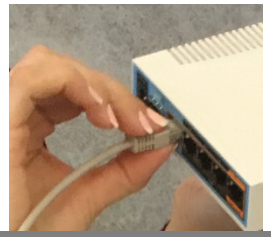
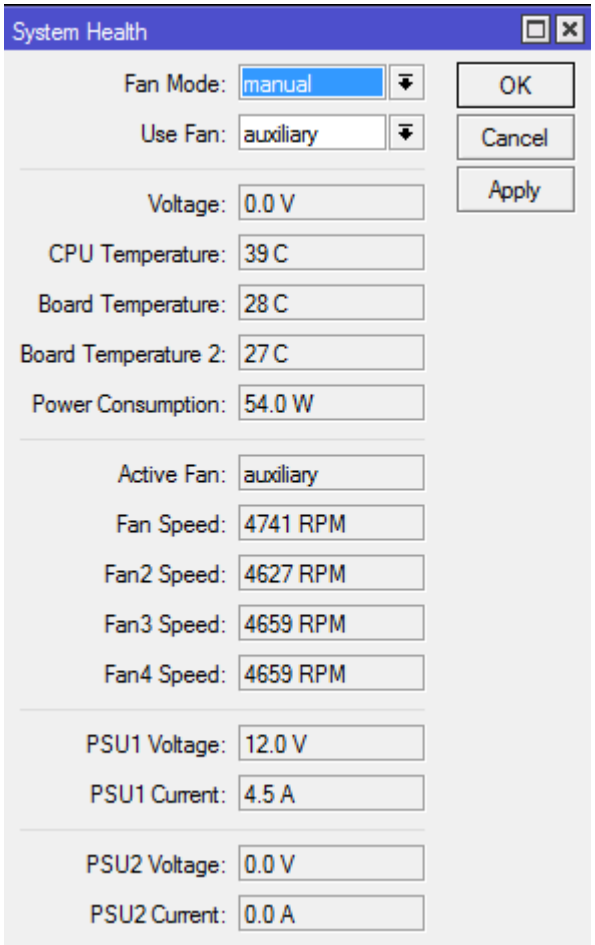
Lack of monitoring



- What is the health of my router?
- Is it reachable from everywhere it should?
- Isn’t it overloaded ?

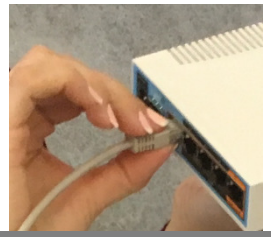
Lack of monitoring

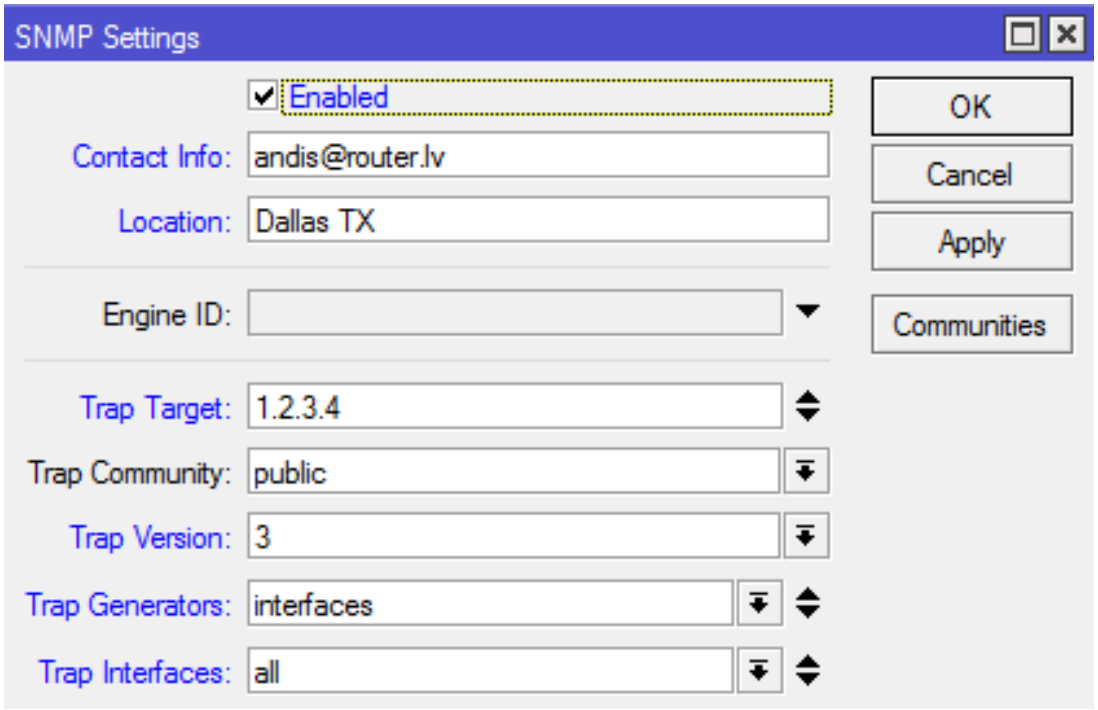





```
[admin@ccr1072] > /system health print
          cpu-overtemp-check: yes
       cpu-overtemp-threshold: 100C
  cpu-overtemp-startup-delay: 1m
             cpu-temperature: 39C
           power-consumption: 55.2W
          board-temperature1: 28C
          board-temperature2: 27C
          board-temperature3: 32C
                psu1-voltage: 12V
                psu2-voltage: 0V
                psu1-current: 4.6A
                psu2-current: 0A
                  fan1-speed: 4724RPM
                  fan2-speed: 4518RPM
                  fan3-speed: 4724RPM
                  fan4-speed: 4627RPM

[admin@ccr1072] > /system health print oid
             active-fan: .1.3.6.1.4.1.14988.1.1.3.9.0
                voltage: .1.3.6.1.4.1.14988.1.1.3.8.0
            temperature: .1.3.6.1.4.1.14988.1.1.3.10.0
  processor-temperature: .1.3.6.1.4.1.14988.1.1.3.11.0
                current: .1.3.6.1.4.1.14988.1.1.3.13.0
      power-consumption: .1.3.6.1.4.1.14988.1.1.3.12.0
             psu1-state: .1.3.6.1.4.1.14988.1.1.3.15.0
             psu2-state: .1.3.6.1.4.1.14988.1.1.3.16.0
```

Lack of monitoring

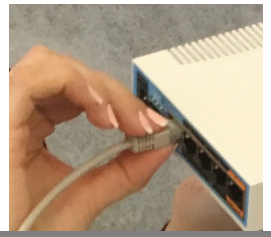




IP - SNMP

/snmp> send-trap for proactive action

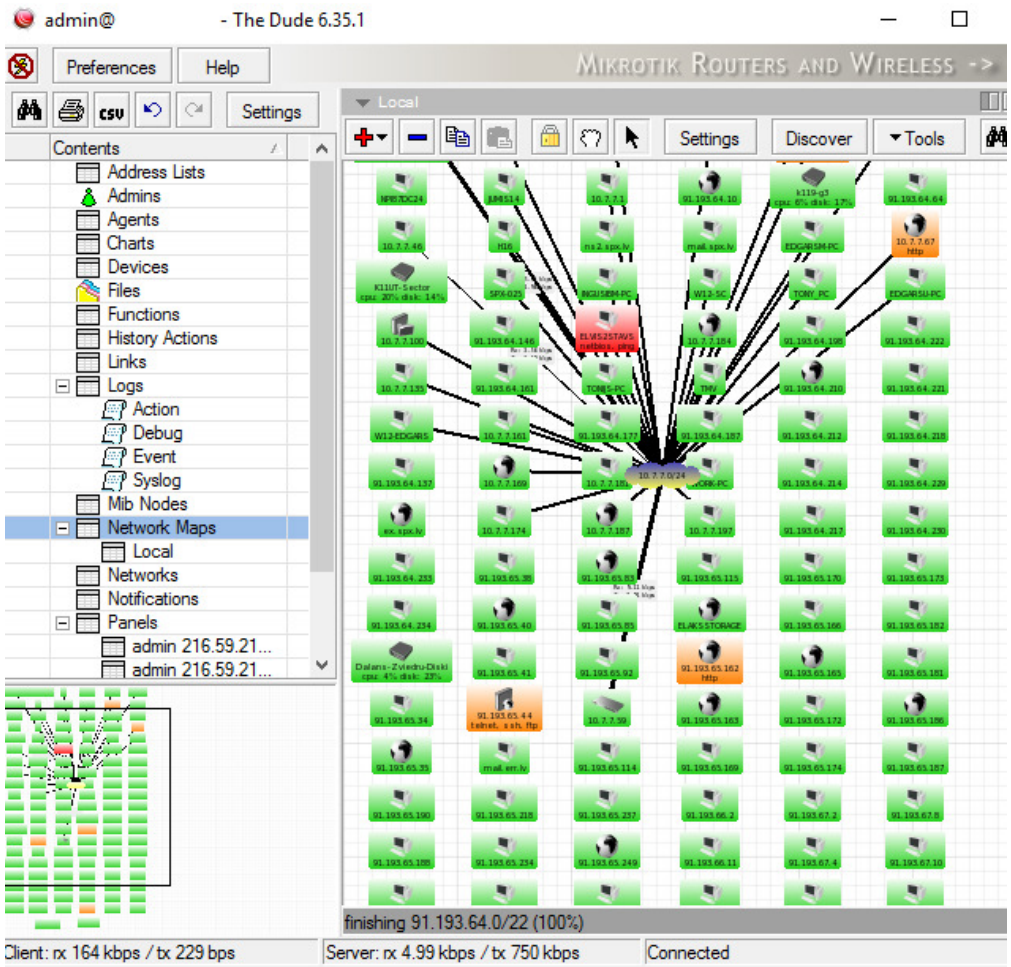
Lack of monitoring



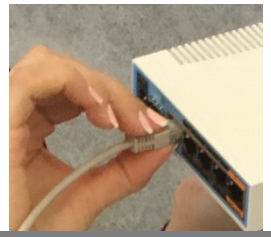
The Dude

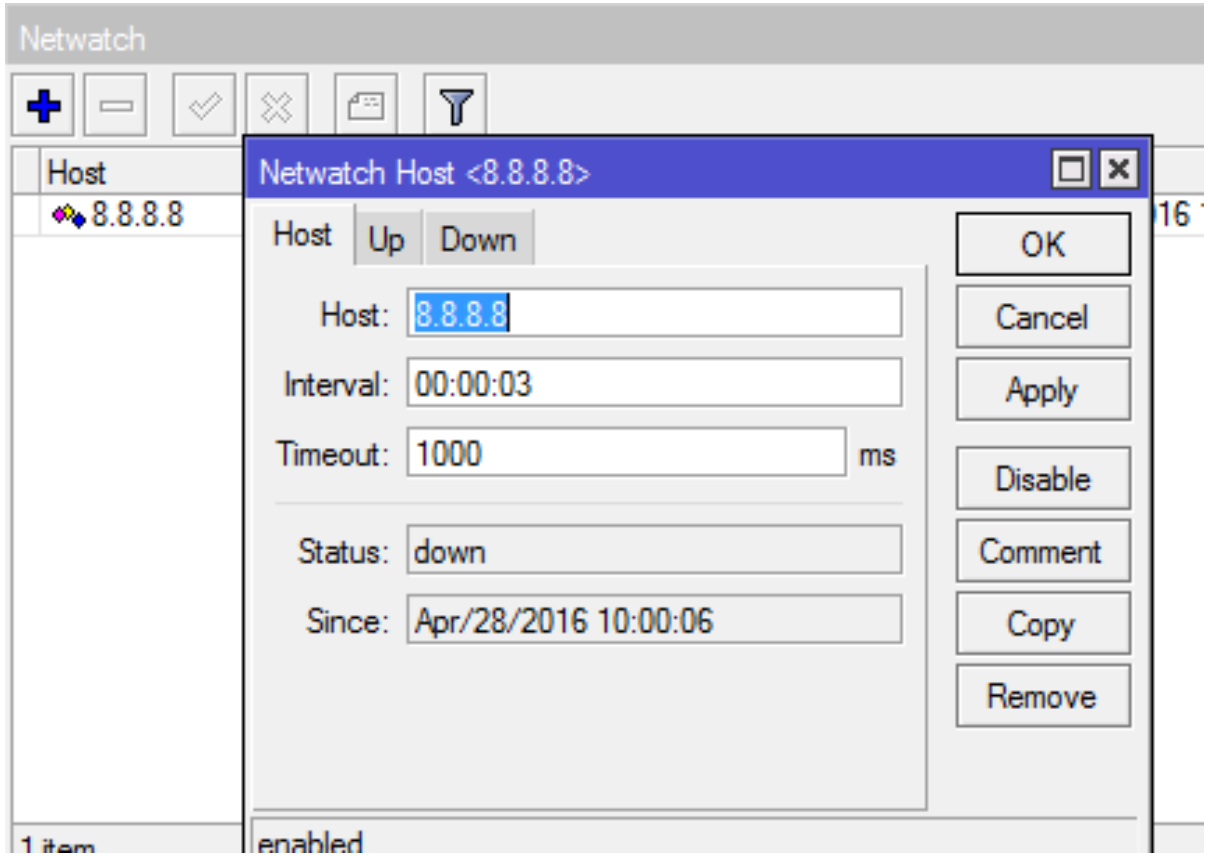
you can monitor and manage your devices

new features since RouterOS 6.34



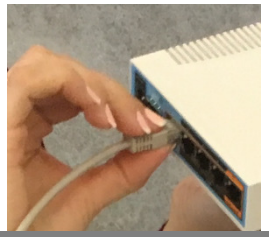
Lack of monitoring

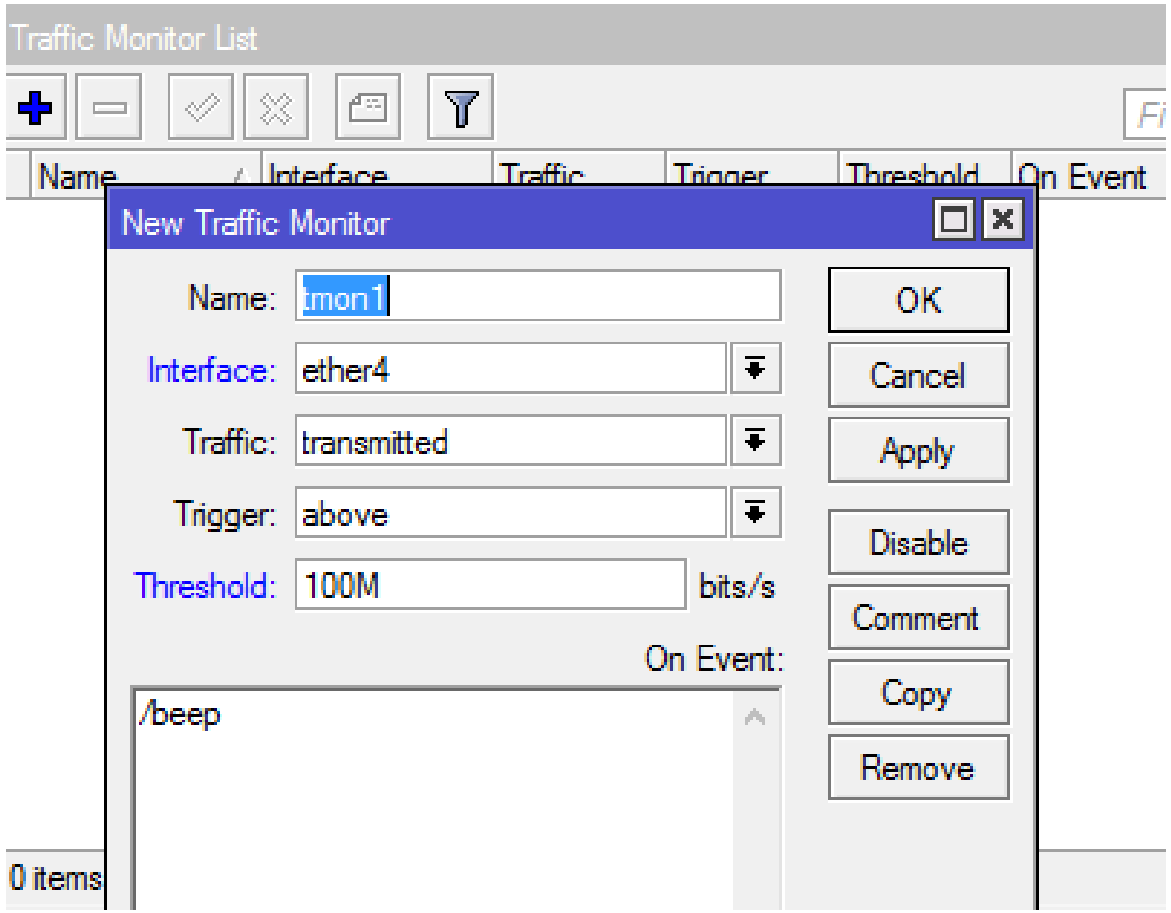




tools-
netwatch

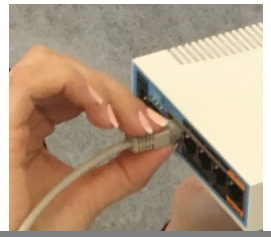
Lack of monitoring



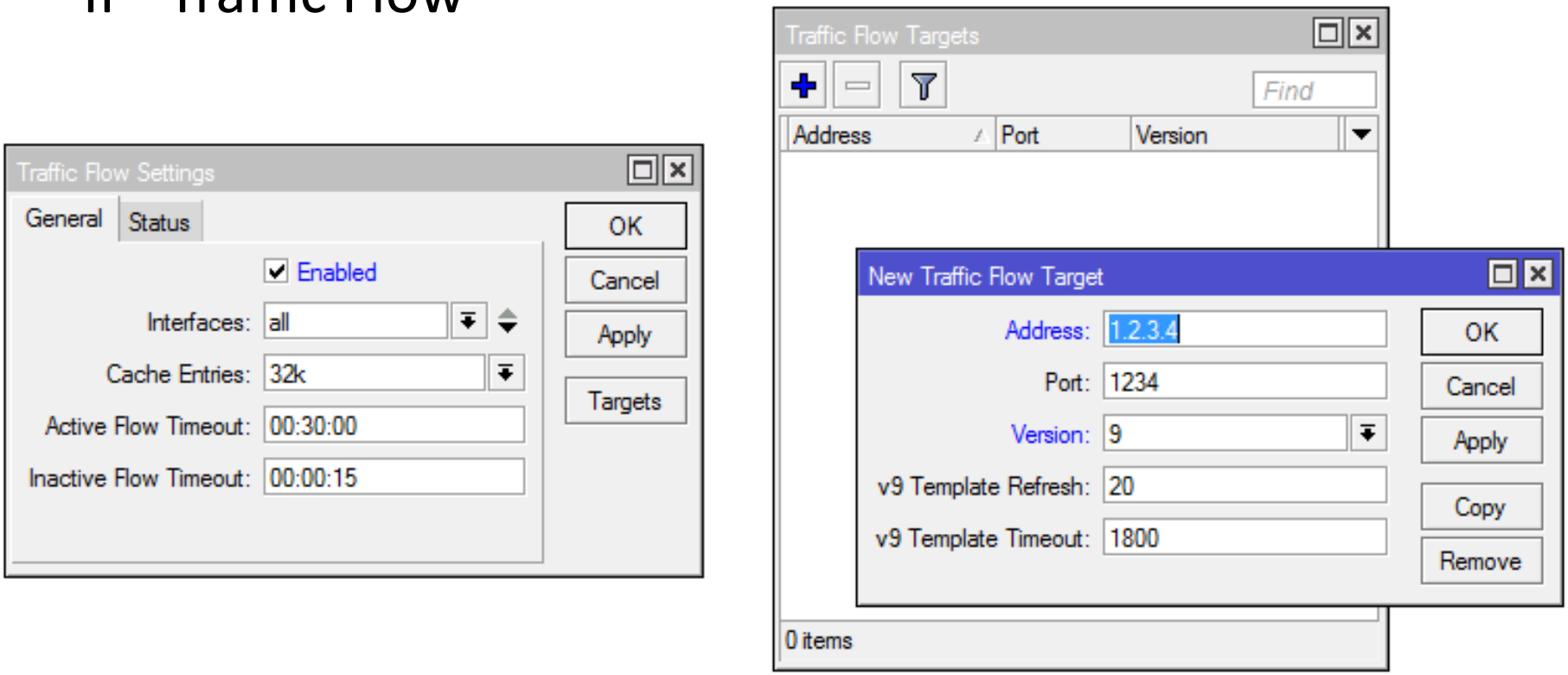


tools-
Traffic monitor

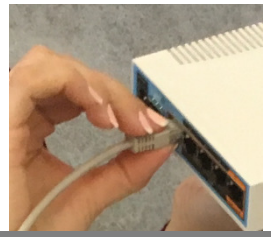
Lack of monitoring



IP- Traffic Flow



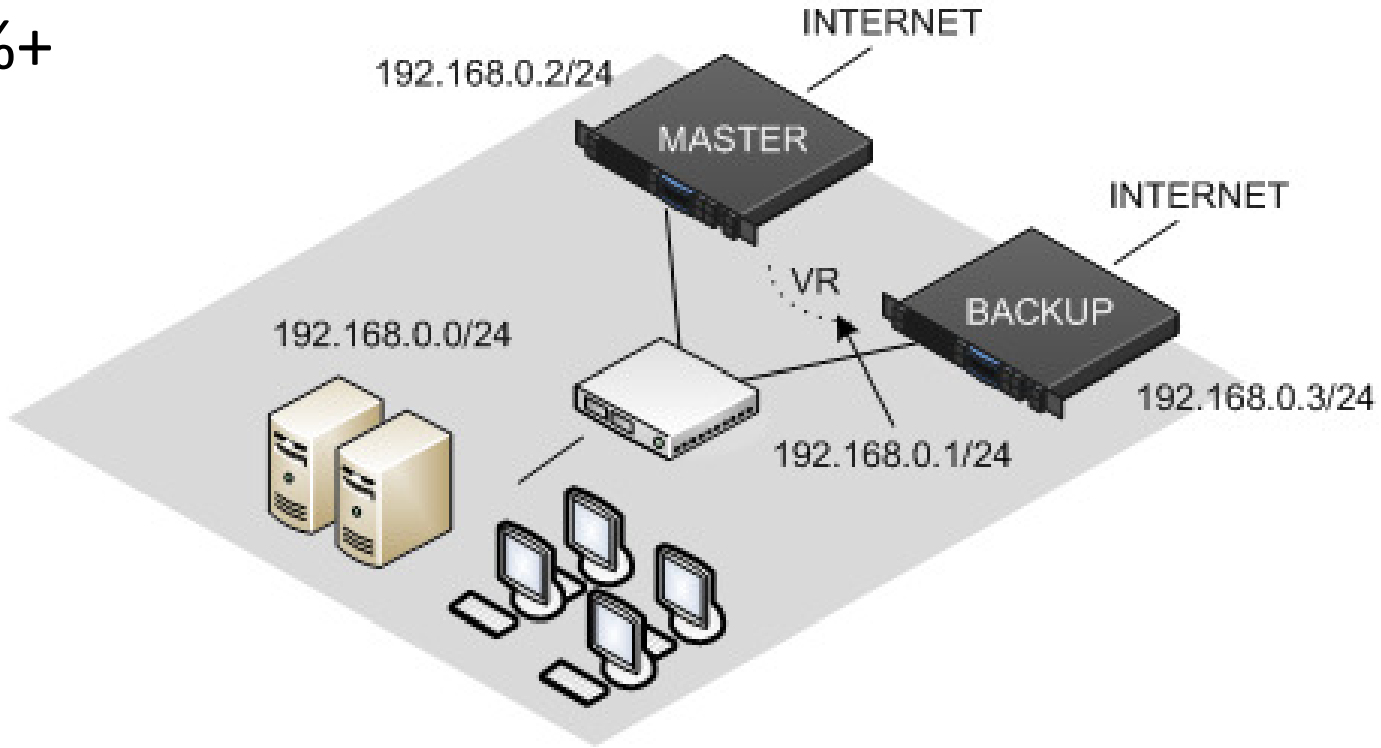
Lack of monitoring



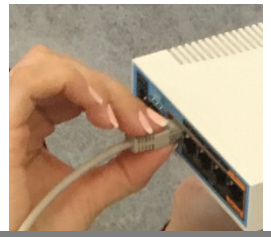
Also HA solutions without monitoring may fail one day

VRRP for 99.9%+ availability

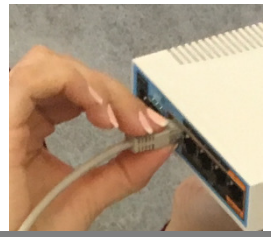
0.365 days or 8.76 hours down in year

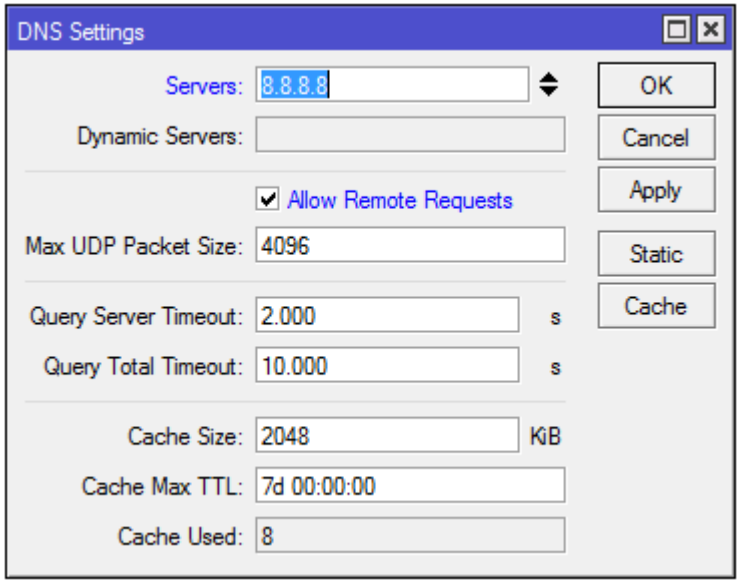


DNS issues

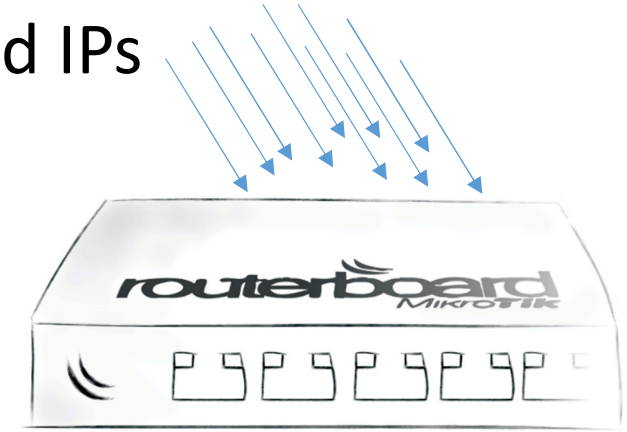


DNS issues





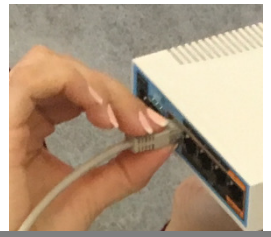
Many requests from spoofed IPs

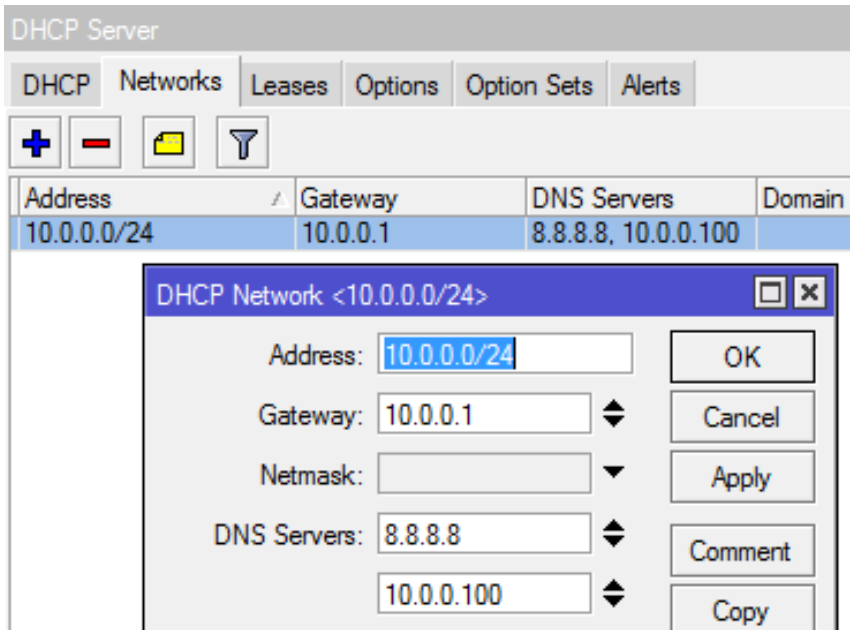


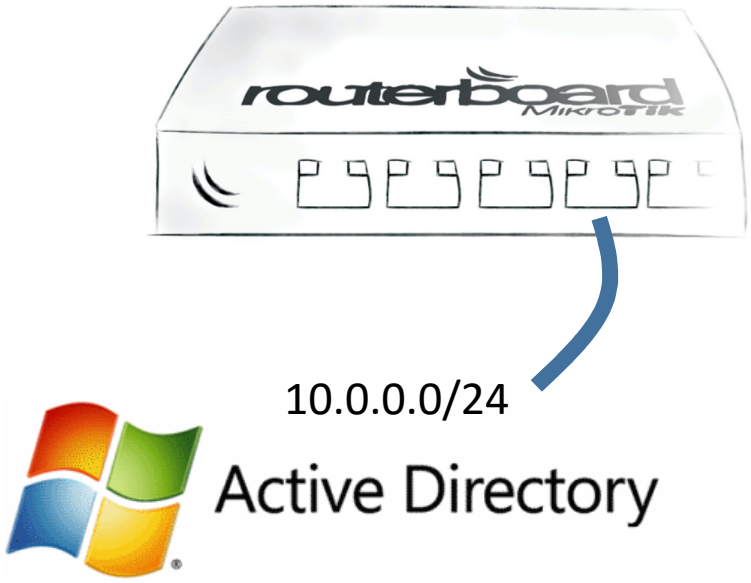

```
#
/ip firewall filter
add action=drop chain=input connection-state=new dst-port=53 in-interface=\
    ether1-INTERNET protocol=udp
add action=drop chain=input connection-state=new dst-port=53 in-interface=\
    ether1-INTERNET protocol=tcp
```

VICTIM

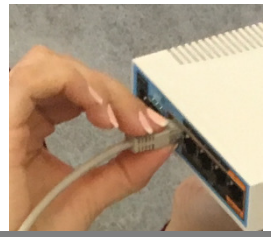
DNS issues




DHCP Server
DHCP
Networks
Leases
Options
Option Sets
Alerts
Address
Gateway
DNS Servers
Domain
10.0.0.0/24
10.0.0.1
8.8.8.8, 10.0.0.100
DHCP Network <10.0.0.0/24>
Address: 10.0.0.0/24
Gateway: 10.0.0.1
Netmask:
DNS Servers: 8.8.8.8
10.0.0.100
OK
Cancel
Apply
Comment
Copy

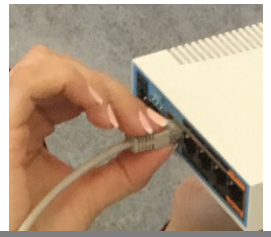

routerboard
MikroTik
10.0.0.0/24
Active Directory

Firewall inefficiency



7

Firewall inefficiency



internet

123.123.123.123
webserver

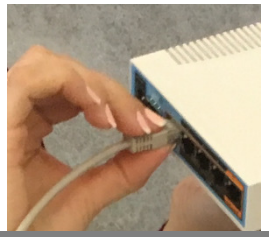
Firewall

Filter Rules | NAT | Mangle | Service Ports | Connections | Address Lists | Layer7 Protocols

00 Reset Counters | 00 Reset All Counters | Find

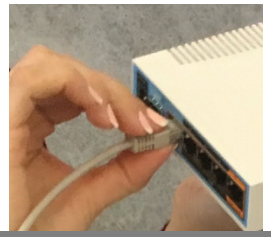
#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port
0	acc...	forward	123.123.123.123	0.0.0.0/0			
1	acc...	forward	1.1.1.1	123.123.123.123			
2	acc...	forward	2.2.2.2	123.123.123.123			
3	acc...	forward	3.3.3.3	123.123.123.123			
4	acc...	forward	4.4.4.4	123.123.123.123			
5	acc...	forward	5.5.5.5	123.123.123.123			
6	acc...	forward	6.6.6.6	123.123.123.123			
7	acc...	forward	7.7.7.7	123.123.123.123			
8	acc...	forward	0.0.0.0/0	123.123.123.123	6 (tcp)		80,443
9	drop	forward	0.0.0.0/0	123.123.123.123			

NAT issues



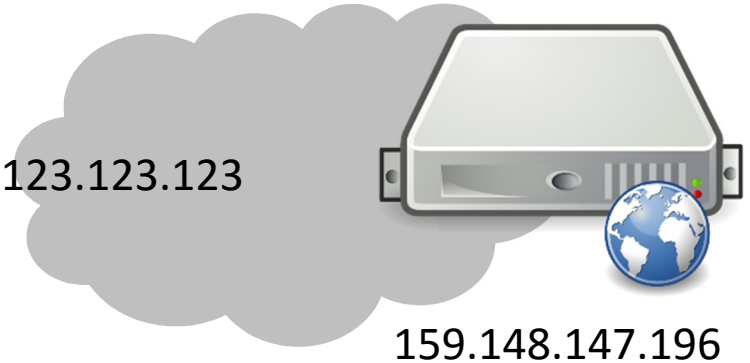
6

NAT issues



10.0.0.0/24

123.123.123.123



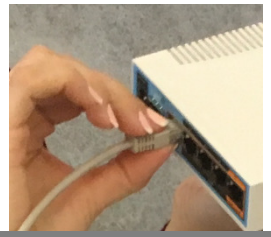
159.148.147.196

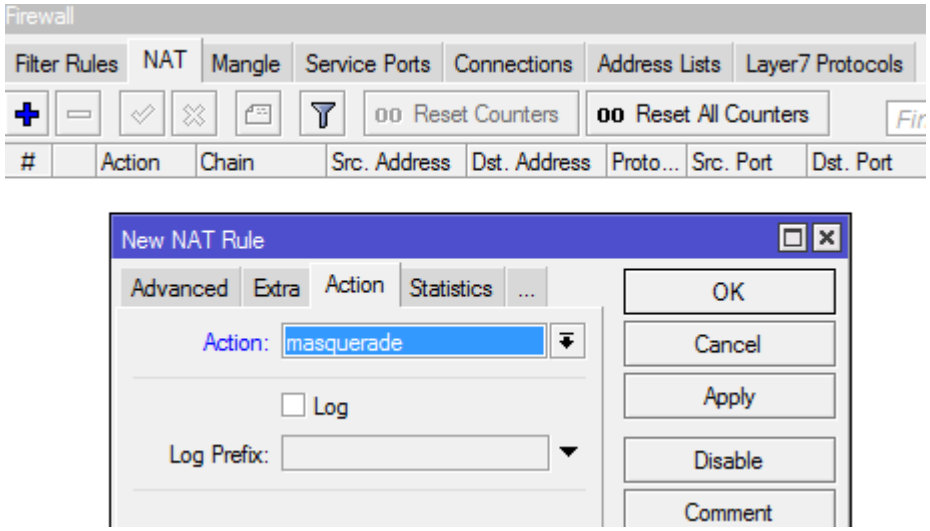
src-ip: 10.0.0.10
dst-ip: 159.148.147.196

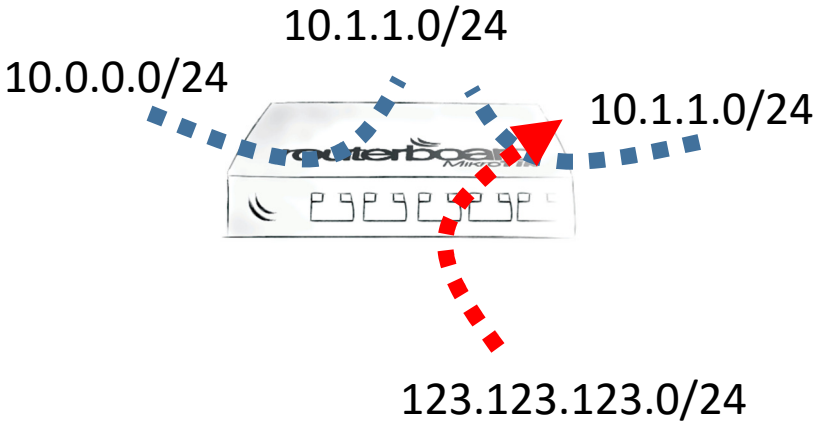
NAT
masquarade

~~src-ip: 10.0.0.10~~
src-ip: 123.123.123.123
dst-ip: 159.148.147.196

NAT issues







bad

```
/ip firewall nat
add action=masquerade chain=srcnat
```

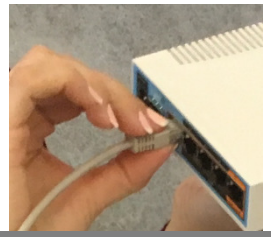
ok

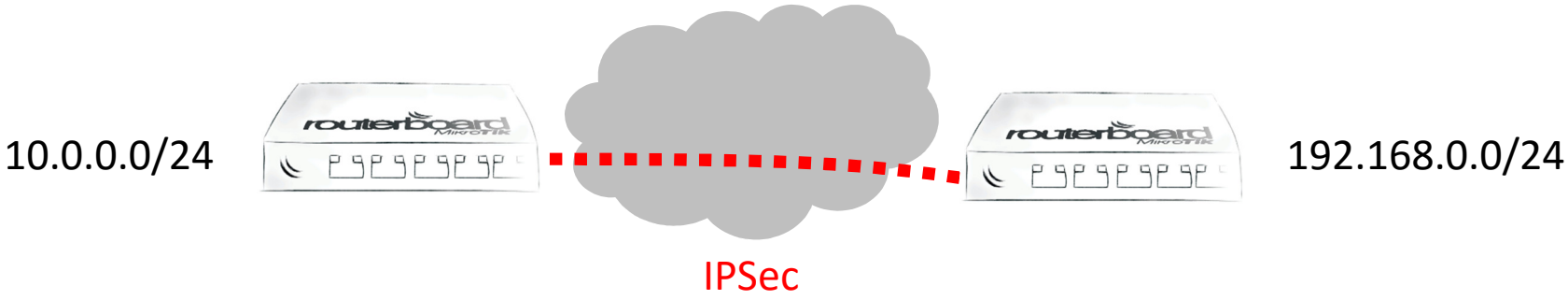
```
/ip firewall nat
add action=masquerade chain=srcnat out-interface=ether1-INTERNET
```

ok

```
/ip firewall filter
add action=drop chain=forward connection-state=new dst-address=\
    10.0.0.0/24 in-interface=ether1-INTERNET
```

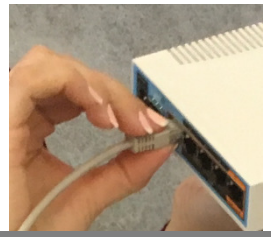
NAT issues





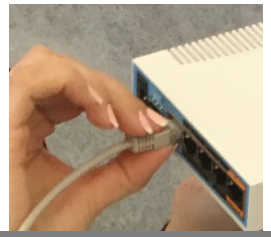

```
/ip firewall nat
add action=masquerade chain=srcnat out-interface=\
    ether1-INTERNET src-address=10.0.0.0/24


/ip firewall nat
add chain=srcnat dst-address=192.168.0.0/24 src-address=\
    10.0.0.0/24
add action=masquerade chain=srcnat out-interface=\
    ether1-INTERNET src-address=10.0.0.0/24
```

Allowed IP Spoofing



5

Allowed IP Spoofing



10.0.0.0/24

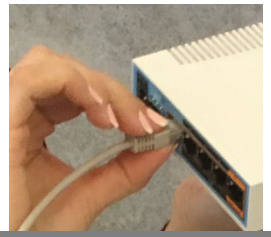
123.123.123.123

src-ip: 13.13.13.13
dst-ip: 159.148.147.196

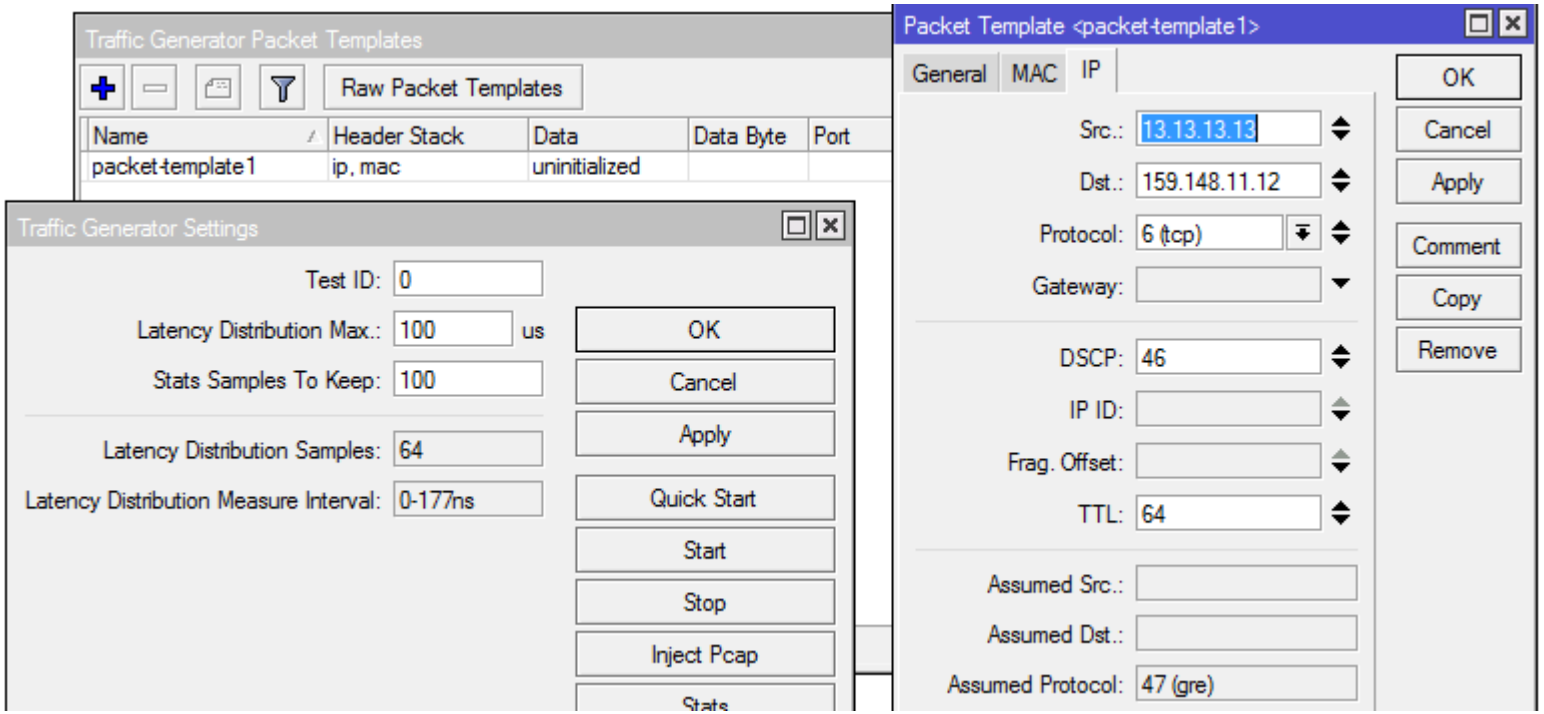
?

1. routing decision
2. firewall decision

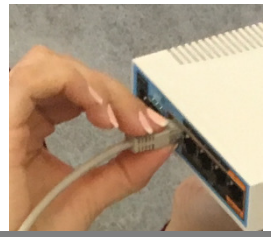
Allowed IP Spoofing



Tools- Traffic Generator



Allowed IP Spoofing



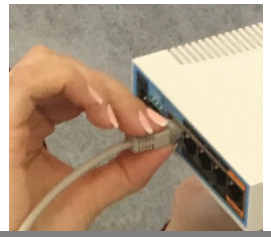
Test your network https://**spoofer.caida.org/**

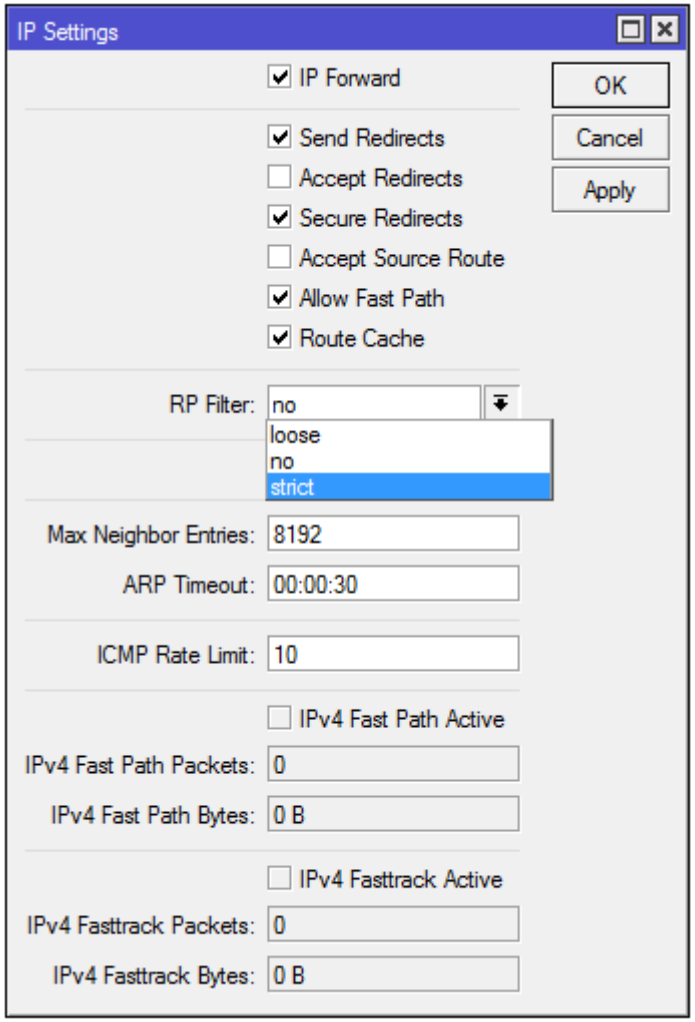
Firewall as a service in SDN OpenFlow network
Andis Arins
Information, Electronic and Electrical Engineering (AIEEE), 2015 IEEE 3rd Workshop on Advances in
Year: 2015
Pages: 1 - 5, DOI: 10.1109/AIEEE.2015.7367309
IEEE Conference Publications

▸ Abstract ((html)) PDF (307 Kb) ©

http://ieeexplore.ieee.org/

Allowed IP Spoofing



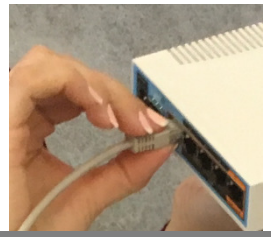


10.0.0.0/24

src-ip: 13.13.13.13
dst-ip: 159.148.147.196

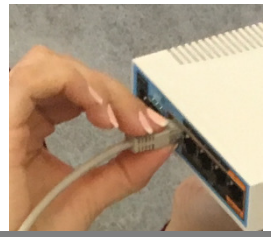
X routing decision

Bridge issues



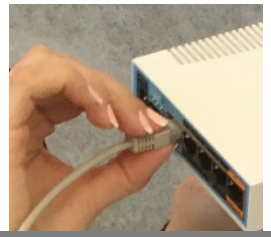
4

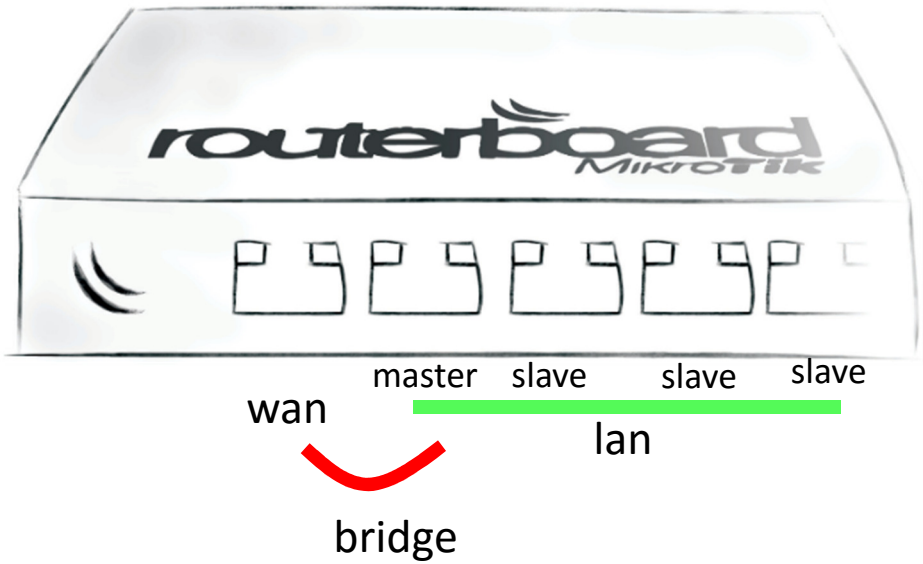
Bridge issues




```
/interface bridge
add name=bridge1-switch-without
/interface bridge port
add bridge=bridge1-switch-without interface=ether2
add bridge=bridge1-switch-without interface=ether1-INTERNET
```

Bridge issues





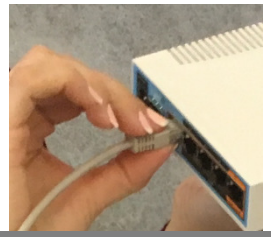
Bridge

Bridge	Ports	Filters	NAT	Hosts

Interface	Bridge	Priority (h...	Path Cost	Horizon	Role
;;; defconf					
ether2-master	bridge	80	10		designated port
;;; defconf					
sfp1	bridge	80	10		disabled port
;;; defconf					
wlan1	bridge	80	10		disabled port
;;; defconf					
wlan2	bridge	80	10		disabled port

```
/interface ethernet
set [ find default-name=ether2 ] name=ether2-master
set [ find default-name=ether3 ] master-port=ether2-master
set [ find default-name=ether4 ] master-port=ether2-master
set [ find default-name=ether5 ] master-port=ether2-master
```

Bridge issues



bridge-lan

DHCP Server

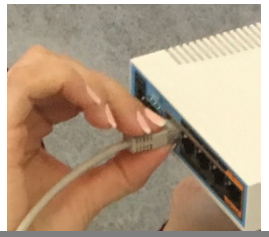
DHCP | Networks | Leases | Options | Option Sets | Alerts

DHCP Config | DHCP Setup

Name	Interface	Lease Time	Address Pool	Add AR...
defconf	ether3	00:10:00	default-dhcp	no

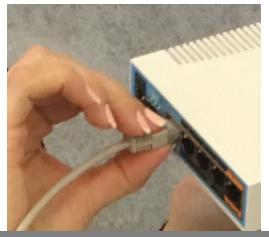
DHCP-Server on individual port, not on bridge itself

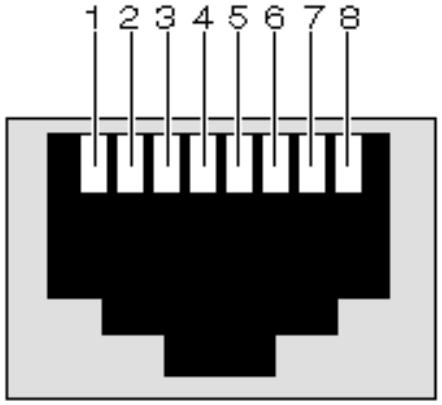
PoE issues



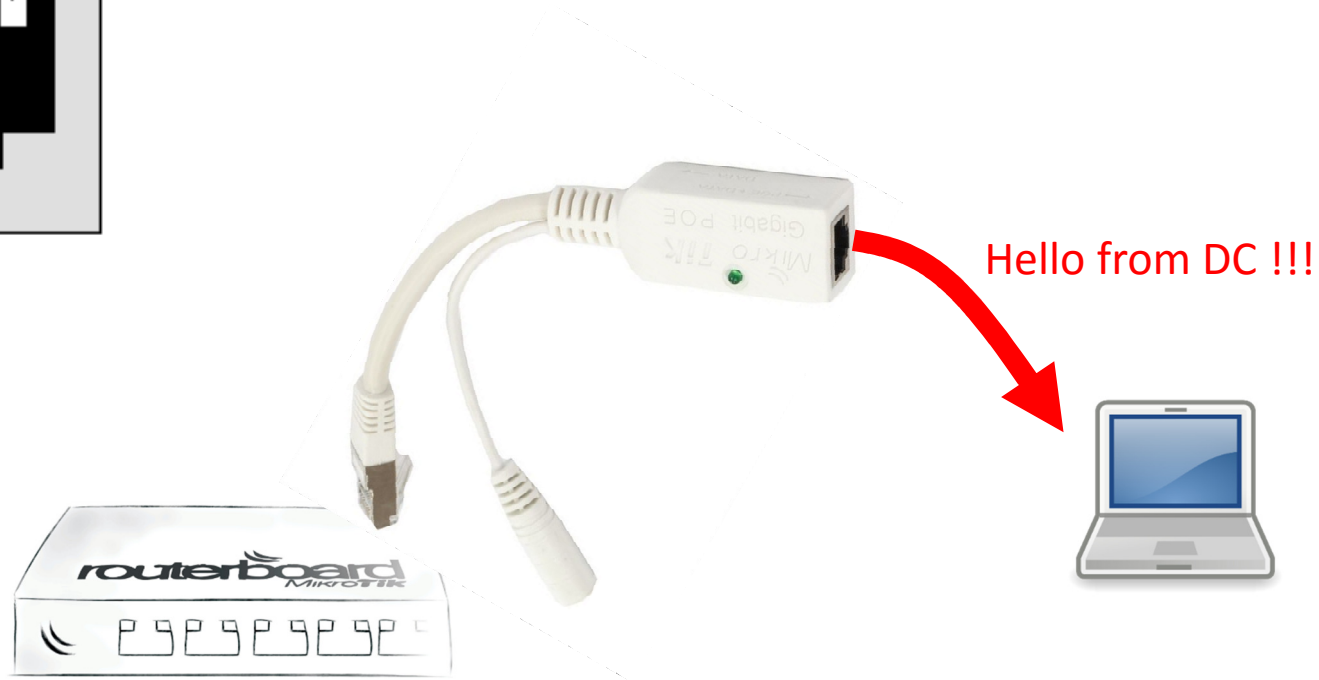
3

PoE issues

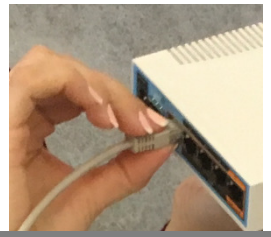


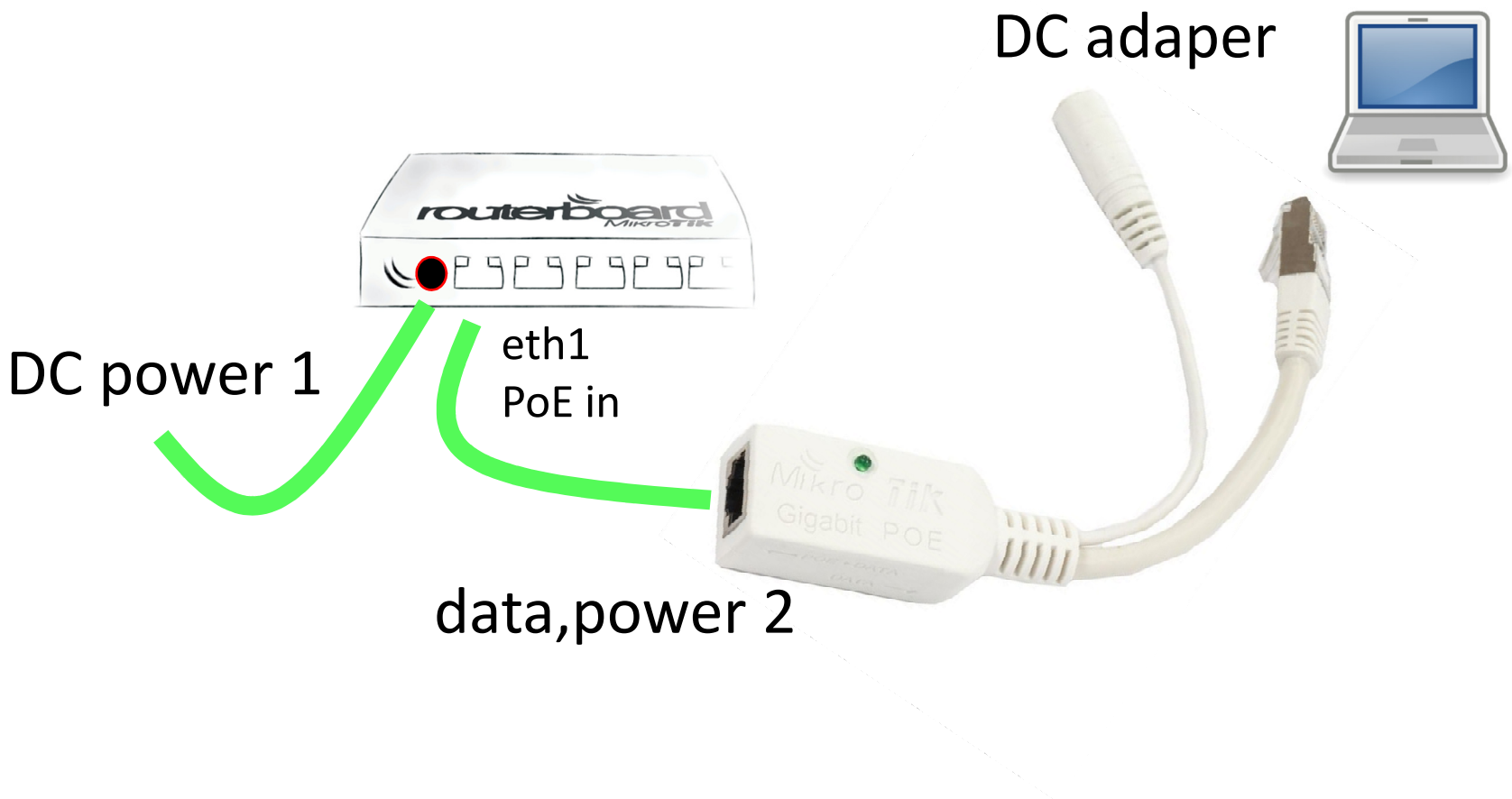


Mikrotik PoE standart
(4,5pin +) (7,8pin -)

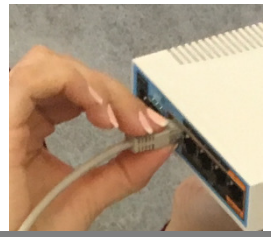


PoE issues



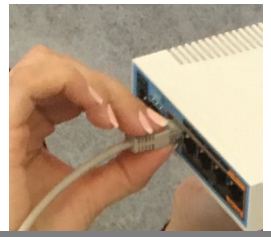

DC adaper
routerboard
Mikrotik
DC power 1
eth1
PoE in
Mikro Tik
Gigabit POE
data,power 2

Waiting for hackers



2

Waiting for hackers



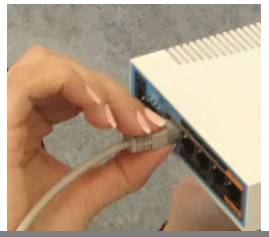
IP Service List

	Name	Port	Available From	Certificate
	api	8728		
	api-ssl	8729		none
	ftp	21		
	ssh	22		
	telnet	23		
	winbox	8291		
	www	80		
X	www-ssl	443		none

Dude (if installed) port 2211

Apr/28/2016 14:28:53	memory	system, error, critical	login failure for user admin from 208.67.1.187 via ssh
Apr/28/2016 14:28:55	memory	system, error, critical	login failure for user root from 208.67.1.187 via ssh
Apr/28/2016 14:28:56	memory	system, error, critical	login failure for user admin from 208.67.1.187 via ssh
Apr/28/2016 14:28:57	memory	system, error, critical	login failure for user test from 208.67.1.187 via ssh
Apr/28/2016 14:28:58	memory	system, error, critical	login failure for user root from 208.67.1.187 via ssh
Apr/28/2016 14:29:00	memory	system, error, critical	login failure for user vagrant from 208.67.1.187 via ssh
Apr/28/2016 14:29:01	memory	system, error, critical	login failure for user pi from 208.67.1.187 via ssh
Apr/28/2016 14:29:02	memory	system, error, critical	login failure for user root from 208.67.1.187 via ssh
Apr/28/2016 14:29:04	memory	system, error, critical	login failure for user ubnt from 208.67.1.187 via ssh
Apr/28/2016 14:29:05	memory	system, error, critical	login failure for user telnet from 208.67.1.187 via ssh
Apr/28/2016 14:29:06	memory	system, error, critical	login failure for user device from 208.67.1.187 via ssh
Apr/28/2016 14:29:08	memory	system, error, critical	login failure for user public from 208.67.1.187 via ssh
Apr/28/2016 14:29:09	memory	system, error, critical	login failure for user admin from 208.67.1.187 via ssh
Apr/28/2016 14:29:10	memory	system, error, critical	login failure for user sysadm from 208.67.1.187 via ssh
Apr/28/2016 14:29:11	memory	system, error, critical	login failure for user write from 208.67.1.187 via ssh
Apr/28/2016 14:29:13	memory	system, error, critical	login failure for user Manager from 208.67.1.187 via ssh
Apr/28/2016 14:29:14	memory	system, error, critical	login failure for user echo from 208.67.1.187 via ssh
Apr/28/2016 14:29:15	memory	system, error, critical	login failure for user guest from 208.67.1.187 via ssh
Apr/28/2016 14:29:17	memory	system, error, critical	login failure for user vcr from 208.67.1.187 via ssh
Apr/28/2016 14:29:18	memory	system, error, critical	login failure for user scmadmin from 208.67.1.187 via ssh
Apr/28/2016 14:29:19	memory	system, error, critical	login failure for user admin from 208.67.1.187 via ssh
Apr/28/2016 14:29:20	memory	system, error, critical	login failure for user admin from 208.67.1.187 via ssh
Apr/28/2016 14:29:22	memory	system, error, critical	login failure for user diag from 208.67.1.187 via ssh
Apr/28/2016 14:29:23	memory	system, error, critical	login failure for user unknown from 208.67.1.187 via ssh
Apr/28/2016 15:33:52	memory	system, error, critical	login failure for user root from 220.124.151.130 via ssh
Apr/28/2016 15:33:55	memory	system, error, critical	login failure for user root from 220.124.151.130 via ssh
Apr/28/2016 15:33:57	memory	system, error, critical	login failure for user root from 220.124.151.130 via ssh

Waiting for hackers



Firewall

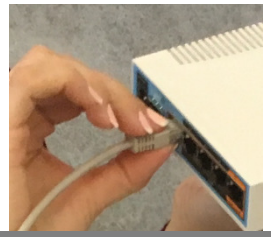
Filter Rules | NAT | Mangle | Service Ports | Connections | Address Lists | Layer7 Protocols

oo Reset Counters | oo Reset All Counters | Find: input

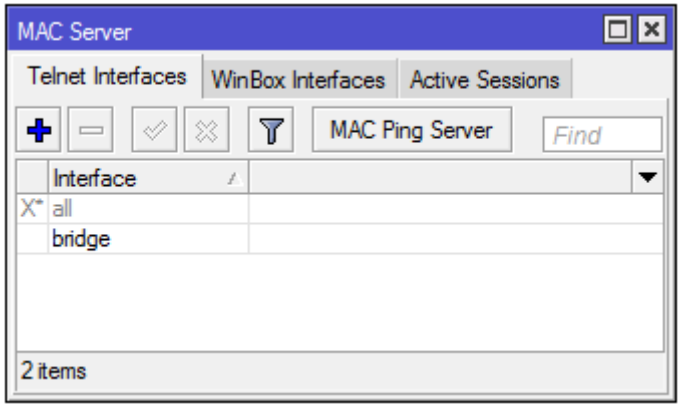
#	Action	Chain	Src. Address	Dst. Address	Protocol	Src. Port	Dst. Port	In. Interface	Out. Int...	Bytes	Packets
;;; drop Invalid connections											
0	drop	input								184 B	3
;;; allow Established connections											
1	accept	input								342.3 KiB	5 010
;;; allow remote administration from mikrotik office. here could come also other whitelists											
2	accept	input	159.148.147.0/24							0 B	0
;;; allow pings ICMP											
3	accept	input			1 (icmp)					0 B	0
;;; allow DNS requests from LAN. Here could be any other services like VPN from internet, Proxy, OSPF etc											
4	accept	input			17 (udp)		53	!ether3-wan		2652 B	36
5	accept	input	192.168.200.0/24					!ether3-wan		7.9 KiB	88
;;; drop everything else											
6	drop	input								6.3 KiB	48

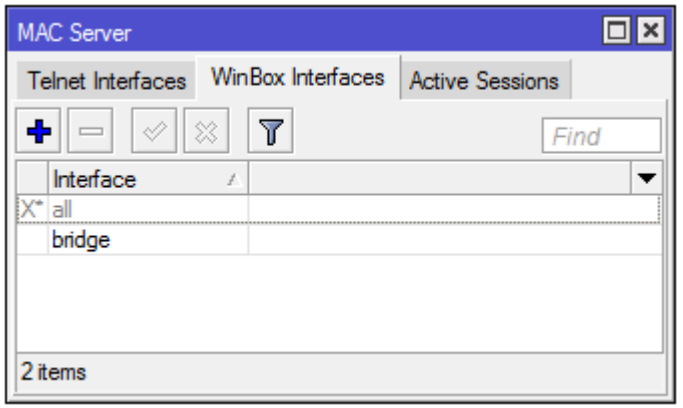
```
/ip firewall filter
add action=drop chain=input comment="drop Invalid connections" connection-state=invalid
add chain=input comment="allow Established connections" connection-state=established
add chain=input comment="allow remote administration from mikrotik office. here could come also other whitelists" \
    src-address=159.148.147.0/24
add chain=input comment="allow pings ICMP" protocol=icmp
add chain=input comment=\
    "allow DNS requests from LAN. Here could be any other services like VPN from internet, Proxy, OSPF etc" dst-port=53 \
    in-interface=!ether3-wan protocol=udp
add chain=input in-interface=!ether3-wan src-address=192.168.200.0/24
add action=drop chain=input comment="drop everything else"
```

Waiting for hackers



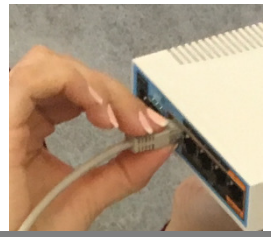
MAC telnet/winbox server on all interfaces



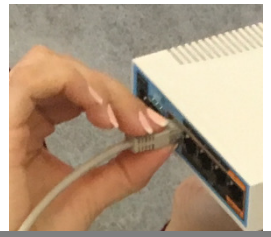


default configuration allows MAC access only from initial bridge

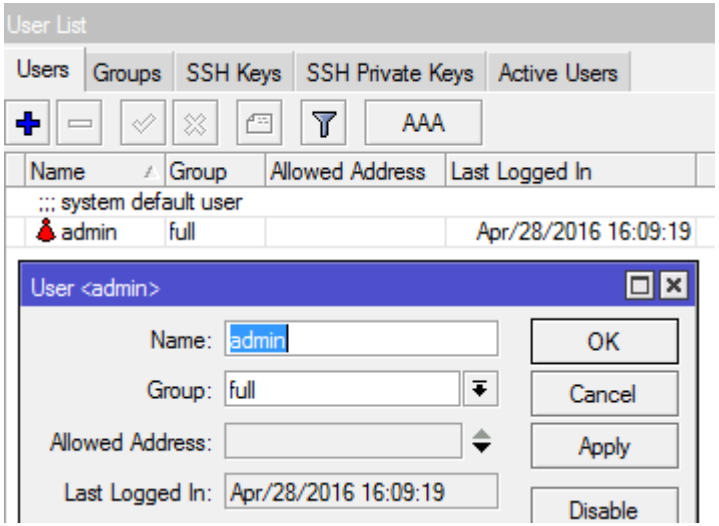
Try to Guess ...



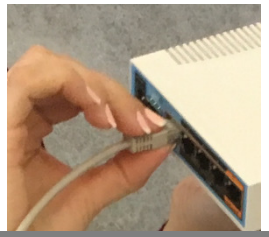
admin / no password

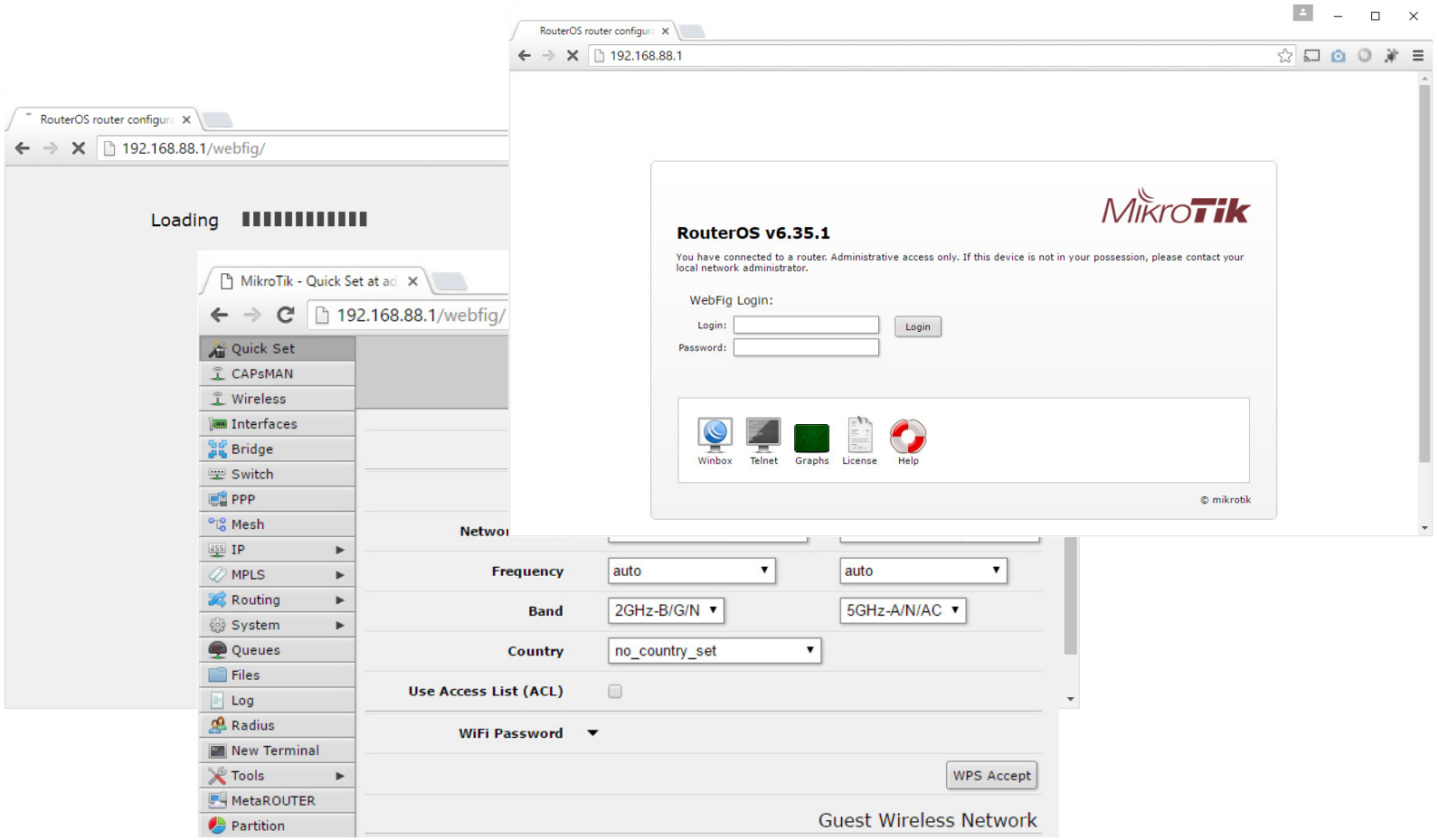



```
[admin@MikroTik] > /system routerboard print
       routerboard: yes
             model: RouterBOARD 941-2nD
     serial-number: 5F5E0563B341
     firmware-type: qca9531L
  factory-firmware: 3.24
  current-firmware: 3.33
  upgrade-firmware: 3.33
[admin@MikroTik] > /user export
# apr/28/2016 09:31:07 by RouterOS 6.35.1
# software id = DIPN-Z4TN
#
/user
add comment="system default user" group=full name=admin
```



admin / no password





That’s it!